Scientific American.

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

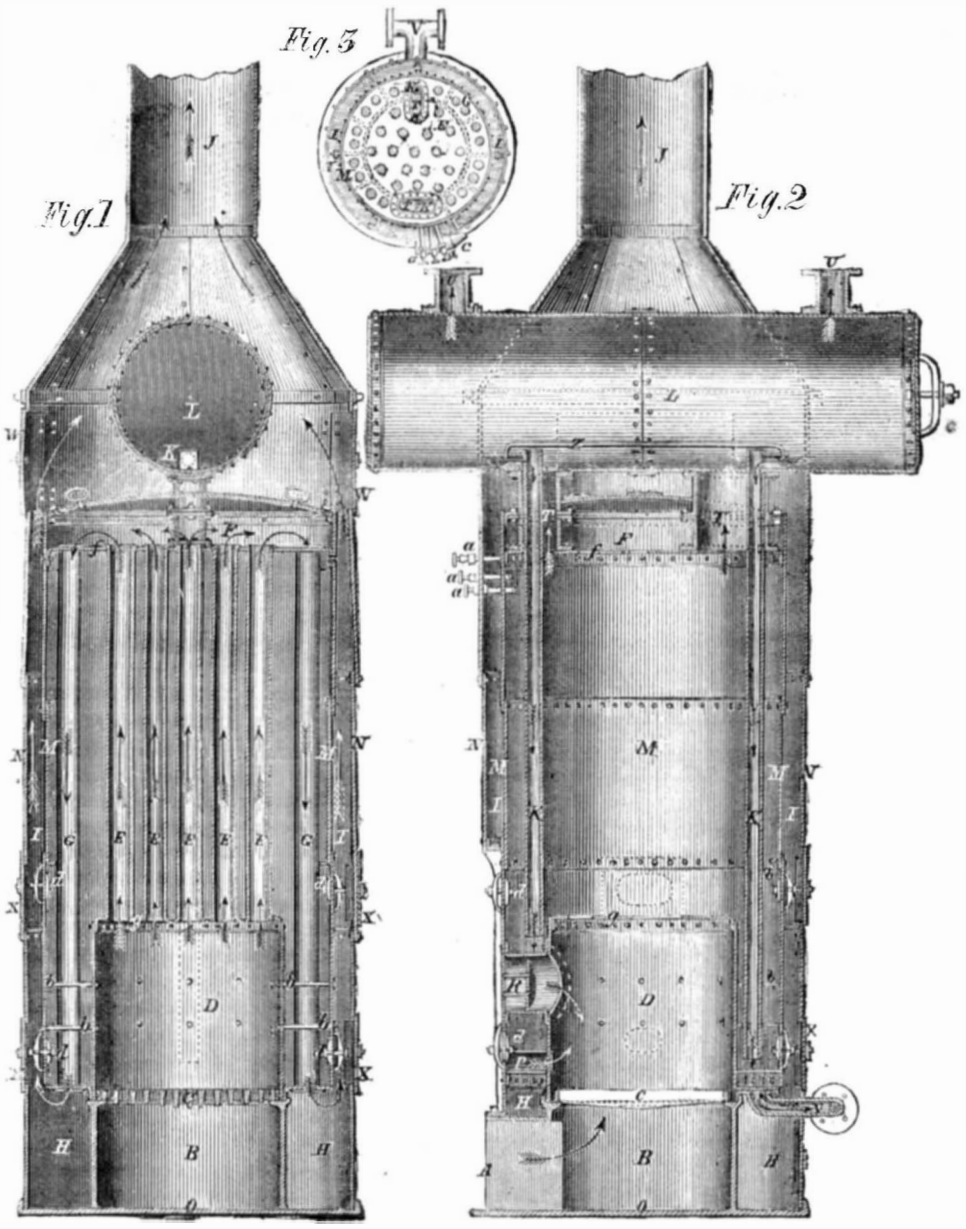
VOL. 1.—No. 14. NEW YORK, OCTOBER 1, 1859. NEW SERIES.

GREGOR MENZEL'S STEAM-BOILER.

This boiler belongs to the class of upright tubular boilers. It takes up but very little room, and it is so arranged that the entire surface of all the tubes and of the shell of the boiler itself is turned into actual heating surface, whereby the same is rendered very economical in fuel. Provision is also made for a free circulation of the water in the boiler, so as to prevent deposition of scale on the side of the heating tubes. This boiler, therefore, can be easily cleaned; it is more durable and less liable to explode than tubular boilers of the ordinary construction.

The accompanying engravings represent, in Fig. 1, a vertical central section of this boiler; Fig. 2 is a similar section taken at right angles to the plane of section in Fig. 1. In this view, the heating-tubes are omitted. Fig. 3 is a horizontal section of the same, taken through the smoke-chamber.

This steam-boiler is so arranged that the products of combustion are conducted from the fire-box through a series of ascending tubes to a smoke-chamber that communicates through a single or double row of descending tubes with a flue at or near the bottom of the boilers; and from this flue said products of combustion ascend again through an annular space formed between a jacket that surrounds the boiler, and between the outside shell of the boiler, to the chimney, serving, in their ascent, to heat the sides of a steam-dome, and to dry the steam contained therein. This dome communicates, by suitable passages, with the water-space of the boiler, and it is furnished with pipes which hang loosely from its underside, extending down into the boiler and near to its bottom, so that the water which may find its way through said passages into the dome is enabled to return to the boiler, thus creating a circulation which prevents the formation of scale on the outside of the heating tubes.



MENZEL'S IMPROVED STEAM-BOILER.

The furnace, C, of this boiler, and the fire-box, D, with the ash-pan, B, are constructed in the usual manner. A door, R, serves to introduce fuel to the furnace, and poles, P, lead to the furnace close over the grate, for the purpose of stirring up the fire and to increase the draught. A represents the door of the ash-pan.

The fire-box, D, is surrouuded by the shell, M, of the boiler, which is connected to the same by stag-bolts, *b*, to prevent it from collapsing. The top plate, *g*, of the fire-box is perforated to receive a series of ascending tubes, E, which extend to the smoke-chamber, F, in the top of the boiler, being steadied on their top ends by the plate *f*, which separates the smoke-chamber from the water-space of the boiler. From this plate one or two rows of tubes, G, descend to the bottom of the boiler, passing between its shell and the outside wall of the fire-box into a flue, H, which is formed around the ash-pan, B, by a jacket, N, that surrounds the boiler. Between the jacket, N, and shell, M, there is an annular space, I, forming a flue, that leads from the bottom flue, H, to the chimney, J. Access can be had to the interior of the boiler by means of openings, X, in the jacket and hand-holes, *d*, in the shell.

The water-space of the boiler communicates, by means of passages, T, with a steam-dome, L, the largest portion of which is surrounded by the jacket, N, and pipes, K, which hang loosely from the under side of this dome, and extend down near to the bottom of the boiler. (See Fig. 2.) These pipes are kept in place by a rod, Z, and they serve to conduct the water which finds its way into the steam-dome back into the boiler. By this means a circulation is effected, which prevents a deposition of scale on the sides of the heating tubes.

Access is had to the steam-dome by means of a man-hole, Q, and the steam is taken from the same by means of apertures, U. A pipe, V, which extends from the bottom of the boiler through the jacket, N, communicates with the blow-off cock. The boiler rests on a bed-plate, O, which may be covered with fire-brick or clay, so that the boiler can be placed on a wooden floor without danger.

The boiler is filled with water up to the gage-cocks, *a*, which are placed over a conductor, *c*, that serves to carry off the drip-water.

After the boiler has been filled, the fire is started, and the products of combustion ascend through the tubes, E, to the smoke-chamber, F, and down through the tubes, G, to the bottom flue, H, and up through the annular space, I, to the chimney. Thus, almost every inch of the shell of the boiler, as well as the entire surface of all the heating tubes, is made available as actual heating surface, and the steam in the dome, L, is perfectly dried before it is drawn off, the largest portion of said steam-dome being surrounded by the jacket, N.

Boilers of this construction have been in use for over a year, to the entire satisfaction of their owners.

A patent was obtained on this invention by Gregor Menzel, April 5th, 1859, and the inventor will be happy to give further information on the same. His address is Milwaukie, Wis.

AMERICAN LOCOMOTIVES IN CHILI.—Recently there was a trial of strength and speed between four railroad locomotives (two British and two American), constructed for the Great Southern (Chilian) Railroad. The result was a great triumph of the American locomotives, whose time was at the rate of 60 miles an hour, with a train weighing 200 tons, with gradients of 56 feet to the mile. The English performance was never over 30 miles an hour with the same train.

FAIR OF THE AMERICAN INSTITUTE.—Our notices of the Thirty-first Annual Fair of the American Institute will be commenced next week. The opening was postponed in consequence of the impossibility of getting ready at the time first announced.

A NEW suspension bridge, now in course of erection over the Ohio, at Wheeling, will have a span of over 1,000 feet. The estimated cost of the structure is $37,000.

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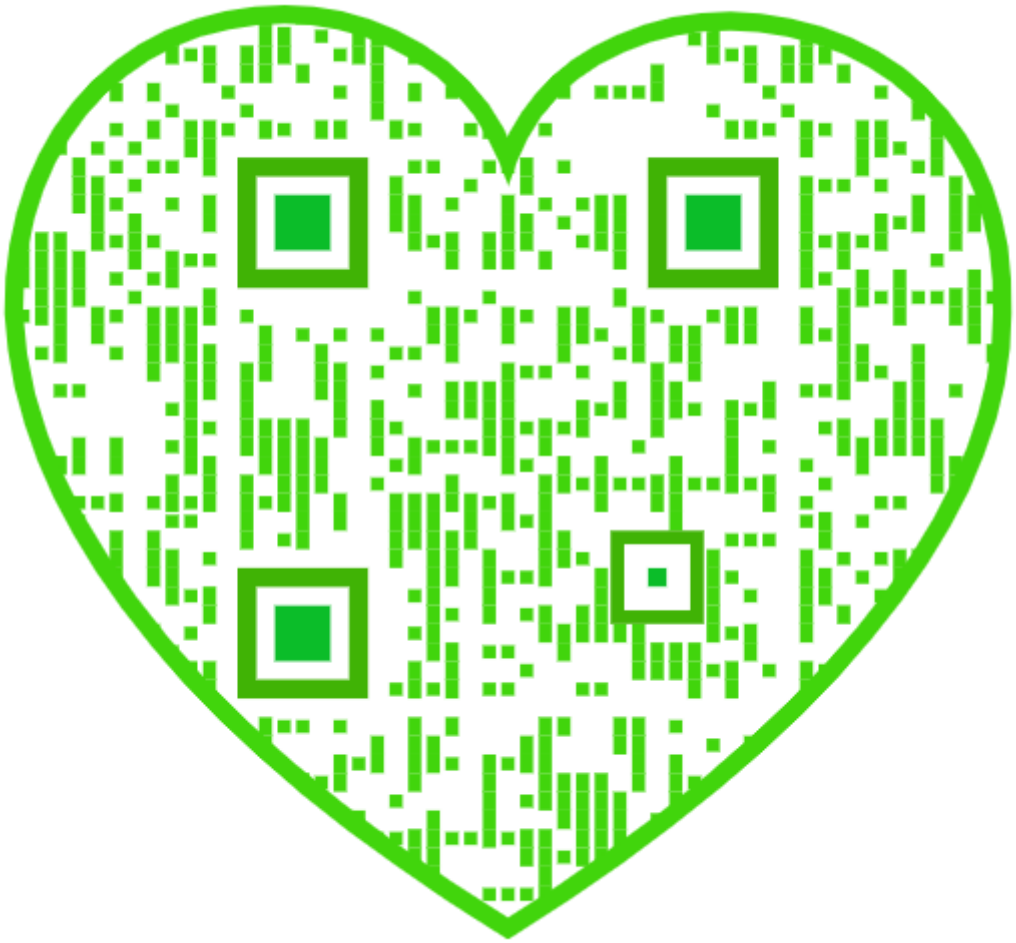

MAKING SUGAR FROM CHINESE CANE-JUICE.

We find some very good information on this subject in the *Ohio Cultivator* for this month, some of which we condense for our columns, accompanied with other remarks, as we know it will be useful to many of our readers at this particular season of the year. It is a well-established fact that frost does not injure the cane-juice or the sugar, but aids the clarification, the juice working more perfectly after a frost than before, and making better sugar and sirup; but warm weather, after hard-freezing, reduces both quantity and quality. After hard-freezing, the saccharine matter separates more readily from the impurities in the juice, and therefore yields a larger per cent. of sugar than if worked before the freezing. Yet we would advise that the ripe cane should be worked up as rapidly as possible, and the operation of sirup-boiling to commence as soon as the cane is ripe, and continued without intermission until the cane is worked up. There is a culminating point in the development of the sugar in the cane, which is the best time for sugar-making. This point or season is when most, if not all the seeds, are ripe, and after several frosts, say when the temperature falls to 25° or 30° Fah. If the cane is cut and housed, or shocked in the field, when in its most favorable condition, it will probably keep unchanged for a long time.

To render the clarification of the juice as perfectly as possible, it should be supplied with some bi-sulphite of lime as it comes fresh from the mill. The most convenient and effectual mode of applying the bi-sulphite is to suspend a keg or bucket of it over the sluice or gutter which conveys the juice from the mill to the juice-box; then, with a gimblet, make a hole in the bottom of the bucket of such a size as to allow the proper quantity to gradually flow out and mix with the juice as it passes from the mill to the juice-box or tank. No time should be lost, it is important to observe, after the juice is expressed from the cane, before the bi-sulphite is mingled with it. The quantity to be used varies with both the character and condition of the cane from which the juice is expressed. The higher the gravity of the juice, the smaller the quantity of bi-sulphite required to make a good clarification; the lower or weaker the juice, the greater the proportion needed. Until experience teaches the operator to know exactly when enough has been used, it will be safe to apply in the proportion of say about one quart to 100 gallons of good sorgho juice. About one quart of good common milk of lime must also be added for every quart of bi-sulphite.

When the juice-tank is filled, stir it thoroughly with any convenient utensil, and after being allowed to stand a few moments, take out a small quantity in a tumbler or proof-glass. If, on examination, the green color of the juice has become changed to a dirty gray, with still a tinge of green, the proper quantity of bi-sulphite has been used; but should the tint still remain decidedly green, stir in some more, and allow the juice to settle. When the contents of the juice-box have well settled, either by means of a gate or siphon, carefully draw off the clear liquid, as you would a cask of wine, into the clarifier; then thoroughly cleanse the juice-box for another batch, and proceed as before. When operations are on a large scale, a number of juice-boxes will be found desirable.

The clear juice being received in the clarifier, raise the temperature to 60° or 65° Fah. (about milk-warm), and then add some milk of lime, and stir well. The clarification should be rendered as perfect as possible, after which the clear juice should be quickly concentrated, without scorching. The evaporation should be continued until the sirup has a thick, waxy consistence, and should then be set aside in wooden coolers in a warm room, to granulate. After the granulation, it should then be placed in barrels, deep boxes or draining-pots, with holes in their bottoms, and allowed to stand in a warm room to drain off the molasses.

If it is the intention of the farmer to make sugar only, the lower joints of the stalks should alone be used for this purpose. The tops of the stalks can be ground by themselves, and made into sirup. The juice in the lower or most matured portion of the cane contains the largest per cent. of crystallized sugar. If the cane has been cut up after a frost, and several days are permitted to pass before it is ground, this will not be necessary, as all parts of the stalks then become nearly alike.

If the weather is warm, all the vessels for containing the cane-juice should be washed once every 24 hours with a liquid containing one-third of bi-sulphite to two-thirds of water, or else with common lime-water. This is to prevent the juice becoming acidulous; and the reason why the lime should be applied to the juice as soon as it is expressed from the cane, is to prevent a like result, because saccharine fluid is liable to combine almost instantly with oxygen when it is forced out of the cells of the cane. The bi-sulphite of lime is an article manufactured in New Orleans, and used extensively in making sugar from the common cane. When it cannot be obtained, the common milk of lime is used as a substitute, and, although it is not by any means equal to it, still it answers a very good purpose. About a quart of good fresh lime, made into a milky condition with water, will answer for 200 gallons of juice, and it is applied in the manner described for the sulphite.

As the cane-juice is kept boiling during concentration, a dense scum arises to the surface, which must be skimmed off. Some white of eggs added to the juice assists in clarification. For making common sugar, any farmer can proceed with common lime, but he must mix it with the juice as it passes from the crushing-rollers. One reason why such different results are obtained by different persons from cane-juice, is owing to carelessness or a want of knowledge in treating the fresh juice with lime, to prevent fermentation.

BURNING WET TAN BARK.

This subject is treated at some length and quite intelligently by a correspondent of our cotemporary, the *Shoe and Leather Reporter*. It is a very important question to all tanners who employ ground bark; because if it can be burned when in a wet and spent condition, a great encumbrauce is thereby removed from the tan-yard, and converted into fuel. The correspondent referred to says:—

"It is within the recollection of the youngest of our trade, when the first steam-engine was employed to drive the machinery of our tanneries, and then only by a few, peculiarly situated, and by those only at a conceded disadvantage, as compared with water-power. The expense of fuel for running a steam-engine of 30 horse power for 12 hours, will vary according to the construction of the heaters, but from two to three cords of wood are usually consumed, which, at the mere cost of cutting and drawing, under the most favorable circumstances, will not be less than from four to six dollars per day. Not only is this entirely saved, by the present method of burning wet tan, but there are other respects in which a great saving results."

He then describes some apparatuses for burning wet bark in the furnace, which we pass over to reach more important topics, when he again says:—

"It will be remembered that for the first year or two, the tan was burnt under the boilers in the same way as wood or coal, and the only addition required was the new form of grates which were called 'cones.' These were only partially successful. But at this time was introduced 'the oven,' which, no doubt, is the important element of success. This was first introduced in Newark, N. J., to burn sawdust, green leather, shavings, &c., and was used in part to drive a steam-engine in a trunk factory. From seeing this, Mr. J. B. Hoyt and Mr. D. B. Crocket conceived the idea that it would answer their purpose for burning wet tan, and at once ordered one to be put up in connection with the boiler and engine then being put in the 'Woodstock Tannery,' situated at Woodstock, Ulster county, then carried on by Messrs. Hoyt, Bros. This was the first oven in which spent tan was burned, and the first perfectly successful effort to drive an engine by wet spent tan alone. Mr. D. B. Crocket afterwards experimented on this first idea, and very materially improved some of the details of construction, and in connection with Messrs. Hughes & Phillips, machinists, of Newark, N. J., stand to day the representatives of one class of burners known as 'Crocket's ovens,' of the merit and cost of which I shall hereafter have occasion to speak. After the introduction of these ovens, the plan of burning under the boilers was entirely given up in this section of the State; but in western New York, and particularly in and near Buffalo, they still retain the 'cone grate,' and burn as before, but I think to great disadvantage, and with only partial success.

"More recently, say within two or three years, still another form of wet tan-burning has been introduced, differing in some respects from Crocket's. I hear that a Mr. Thompson claims the particular merit of having suggested the improvements. They consist in using brick grates, and in feeding the ovens from the top instead of the front of the arches. The first attempt made with this improvement proved a failure; for the grate bars gave out very soon, and the confined heat otherwise reduced the whole mason-work to a complete ruin in a few weeks. But on further experiment and in other hands the brick grates are said to stand remarkably well, and the whole plan is revived, and is coming into quite general use.

"That by one or both of these systems (if indeed they may be considered different in principle) wet spent tan can be used as a motive power, tanners can no longer doubt."

NEW MANUFACTURE OF GUNPOWDER.

At the recent Cornwall Midsummer Sessions, an application was made on the part of Mr. Thomas Davey, one of the firm of Messrs. Bickford, Smith, & Davey, patent safety-fuse manufacturers, Tuckingmill, for a licence to erect a gunpowder mill and magazine at a place called West Towan, in the parish of Illogan. Mr, Davey, on being asked what were the advantages of the powder he proposed to manufacture, replied, "Perhaps I shall best do this by reading to you the provisional specification:—'The improvements in blasting powder consist—first, in the employment of flour, bran, starch, or other glutinous or starchy matter, to replace a part of the charcoal now employed in the manufacture of powder; second, in a new mode of graining the same. By the substitution of the above-named, the component parts are formed into a paste and are easily combined and grained without danger of explosion.' Gunpowder in present use is manufactured from certain proportions of nitrate of potash, sulphur and charcoal, which, by the dangerous process of trituration, are intimately combined; the mixture is afterwards pressed into cakes, dried and then broken into grains of different sizes, according to the use for which the powder is destined. In our process, instead of grinding the powder, the nitrate of soda or potash is dissolved in sufficient water to make a thick paste of the whole, and it is thus kneaded, to make it homogeneous. It is then rolled into cakes and cut into grains; or, while in a paste pressed through a perforated or wire sieve, with apertures or holes of the size of the grain to be produced. The matter falls on an endless canvas, which is put slowly in motion, and passes on through a drying-room, bearing with it a thin covering of the blasting composition divided in strings or long grains by the sieve, and after being dried, it is passed between two rollers, which break it into grains of a convenient size."

Mr. J. J. Rogers: "Then you consider there is no danger of explosion, the composition being wet?" Mr. Davey: "Not the slightest. We use 30 per cent. of water."

Mr. Rogers: "How do you prevent the coagulation of the wet particles after they have fallen down from the sieve?" Mr. Davey: "By keeping the canvas moving, but should there still be a slight connection between the particles, it is broken on being passed through the wooden rollers, after the composition is dried."

Mr. Reynolds: "What difference is there in the appearance of your powder and the powder manufactured by the old process?" Mr. Davey: "Ours is very like gunpowder-tea in appearance; it has no gloss."

Messrs. Freeman & Sons, the granite contractors, had tried the new powder, and found that it possessed qualities superior to other blasting powder, accomplishing all that was done by the latter at a saving of 37 per cent. in weight.

Captain N. Vivian, of Condurrow, said that he weighed the new powder before testing it, and found that the same quantity in bulk weighed 33 per cent. less. He had six holes bored in very hard granite and charged with powder, putting no more into them than he should have done of the old powder, and in every case it acted satisfactorily. It emitted much less smoke than the old powder, which in blasting a mine was a matter of very great importance. If it were sold at the same price in weight as the old powder, it would, of course, be much cheaper as it was much lighter.

In answer to Mr. Reynolds, Mr. Davey said that the

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powder would be rather cheaper than that now used as, less niter was employed in its manufacture, and the process was quicker. The chairman said the Court would grant the application.

The *Mining Journal*, from which we take these particulars, observes:—"We understand a vast number of experiments have been made (with Mr. Davey's powder), and from the testimony of the leading managers it appears certain that a saving of at least one-third in the expense will be effected. It is less dangerous than ordinay powder, produces very little smoke, and that of a less pungent kind than usual, not only enabling the miner to work in close places without the delay consequent on smoke, but greatly diminishing the unhealthy effects of it in the mines. Mr. Davey's father was the inventor of the safety-fuse patented by Bickford & Davey, and we hope this invention of Mr. Simon Davey, of Rouen, will prove of equal importance to the miner and others."—*London Engineer.*

THE COTTON MANUFACTURE IN THE UNITED KINGDOM.

The London correspondent of the *National Intelligencer*, in a recent letter, furnishes a mass of interesting information respecting the cotton manufacture in the United Kingdom. He says:—

"With the exception of the cereal or corn-bearing and bread-producing family of plants, and the timber trees of the forest, there is probably no member of the vegetable kingdom of more importance to the human family at the present time than the cotton plant. Flax and hemp, tea, coffee and the sugar-cane, rice, tobacco and the potato root, the vine grape and the apple tree, all contribute most essentially to our necessities, comforts and luxuries; but they, one and all, fall universally behind the cotton plant in their importance to the great interests of mankind. Herodotus, who wrote in 450, before Christ, or more than 2,300 years ago, says that the cotton plant and manufactures out of its woolly produce existed in India at that time. We will not dispute with the father of history upon that point. Cotton was manufactured in Germany in 1430; and Antwerp, Venice, Bruges and Ghent produced large quantities of fustians and dimities, of very fair sorts, in 1560. Cotton-wool is supposed to have been first manufactured in Great Britain about 1585, when a number of Belgian artisans, driven from home by religious persecution, established themselves in the neighborhood of Manchester; and a small work, published by Lewis Roberts in 1641, entitled 'The Treasure of Traffic,' says that Manchester was then distinguished for its cotton manufactures, and that the fustians produced there were then in almost general use throughout the nation. 'It has been conjectured,' says Mr. Baynes, 'that the word "cottons" was a corruption of coatings.' The consumption of cotton-wool then in England was only 1,000,000 pounds, and the number of persons employed was only 2,500 in 1700; by 1720, the quantity used was 2,200,000 pounds; and in 1775, only 4,800,000 pounds. In 1787, the quantity used was 22,600,000 pounds; the great start made in the preceding 12 years was occasioned by the introduction of the improved machinery invented by Wyatt, Hargreaves, Arkwright, Crompton and Cartwright. In 1764, the importation of raw cotton was 3,870,000 pounds; in 1790, the importation was 30,603,451 pounds; and in 1800, no less than 56,094,720. In 1856, it amounted to 1,024,886,528 pounds. In 1807, one-half of the cotton consumed by Great Britain was the produce of the United States. In 1856, more than 75 per cent. of the whole amount was supplied by that country. In 1800, the exports of raw cotton from England were 4,416,610 pounds; in 1856, it was 146,660,864 pounds; the remainder was consumed in Great Britain, namely, 51,678,110 pounds in 1800, and 878,225,664 in 1856. The present century opened with exports of yarns and goods of the official value of £5,854,057; and the year 1856 closed with an export of £163,837,196. This official value is more an index of quantity than of value; it, however, accurately shows the wonderful increase of the trade. The declared value of goods and yarn exported in 1858, was £39,113,409; the whole value of goods manufactured in 1757 was £55,212,000. In 1843, the number of persons of both sexes and all ages employed in the cotton manufacture of Great Britain and Ireland was 259,385; in 1850, it was 330,924; and in 1856, it was 379,213. The capital in the cotton trade in the United Kingdom was estimated, in 1857, to have been £55,500,000. Besides about 400,000 persons now employed in spinning and weaving, about 300,000 more are engaged in printing, dyeing, bleaching, &c. If to these be added machine-makers, iron-founders, millwrights, engineers, builders of all kinds, chemists, &c., it is said that it will be found that nearly 4,000,000 individuals are dependent upon the prosperity of the cotton trade for their livelihood. Such are some of the details of one of the numerous directions in which capital finds employment. Bright and refulgent has almost uniformly been the past of the cotton trade, as a branch of the world's industry; there is a gloom cast over the present, and an uncompromising aspect given to the future. The total amount of the exports of cotton-yarn and goods is equal to one-fourth of the whole exports of the country. The stability of this trade is, therefore, of the first importance; and that stability depends, of course, upon the certainty of a full supply of raw material."

MARVELS OF THE MISSISSIPPI.

Under the above caption, a correspondent at Chicon Pass, Louisiana, sends us a communication containing some facts, in regard to the great river, which would hardly have been anticipated. He says that its width gradually diminishes towards the mouth; that for 500 miles above the Missouri the average width is about 3,600 feet; from the Missouri to the Ohio it is about 3,200 feet; from the Ohio tothe Arkansas, about 3,000 feet; from the Arkansas to the Red River, about 2,700 feet; and from the Red River to the Gulf, about 2,100 feet. He also says that 40,000 square miles of fruitful land have been reclaimed by making levees and cutting off outlets at the lower part of the Mississippi. (The area of the State of New York is 46,000 square miles). Our correspondent further says that the effect of constructing levees and cutting of outlets has been to deepen the channel, and to diminish the hight of the water in freshets. And finally his last statement is that, in most places below Red River, the channel is below the level of the ocean, in some places 150 feet. (Not the surface of the channel we presume.) In regard to the object for the advocacy of which our correspondents communication was written—the closing of Bayou Plaquemine—even the facts which he has sent us do not sufficiently cover the whole ground to enable us to form an opinion, and we leave it to his own championship, for which he appears to be abundantly competent.

TRIALS OF FARMING MACHINES.

From the *Canadian Agriculturist and Journal* we obtain information of the trials of machines and implements which took place before the Board of Agriculture of Lower Canada on Aug. 16th.

The proceedings commenced with a trial of mowers in a field of fine clover. Four machines were entered by Messrs. B. P. Paige & Co., M. Moody, W. A. Woods, and Messrs. Nourse, Mason & Co. Messrs. Paige's machine broke down through an accident before the trial was half over. Each of the other machines cut an acre of clover. Messrs. Nourse's mower did the work in 39 minutes; weight, 485 lbs.; average draught or power required to drag it through the grass, 250 lbs.; width of swath, 5 feet; cost of machine at the place where made, $90. Mr. Woods' machine did the work in 49 minutes, from which 10 minutes had to be deducted for lost time; weight, 514 lbs.; width of swath, 4 feet; draught, 175 lbs.; price, $80. Mr. Moody's did the work in 51½ minutes, having been delayed by an accident to the gearing; weight, 600 lbs.; draught, 240 lbs.; width of swath, 4 feet 6 inches; price, $100 for mower; $120 for combined mower and reaper.

The next trial was of reapers in a field of barley, which was not in a very favorable state for fairly testing the merits of the difierent machines, owing to the nature of the ground and a portion of the grain being laid and matted. Mr. Woods' combined reaper and mower did the task allotted to it in 33½ minutes; Mr. Helm's reaper and self-raker in 36 minutes. Mr. M. Moody had a machine entered for this trial, but it broke down and was withdrawn before the trial closed.

The prizes were awarded as follows:—Reapers—1st, John Helm, Jr.; 2nd, B. P. Paige & Co., Montreal. Mowers—1st, W. A. Woods & Co., Hoosick Falls, N. Y; 2nd, Nourse, Mason & Co., Boston; 3rd, M. Moody, Terrebonne, C. E.

There was also a trial of plows, threshing machines and other implements, and the competition was the best that has ever taken place in Canada East; and the *Agriculturist* says, in reference to it and the display of American machines:—"There is no doubt that when another of a similar sort takes place there will be a much larger display of implements, and a much better turn-out of practical agriculturists from various parts of the country, as means will be taken to make it better known than were adopted in the present instance. The collection of implements exhibited by Nourse, Mason & Co., of Boston, was splendid for every quality or nature of soil, and every sort of work to be performed on a farm. Many of these implements have not yet been introduced amongst us, our farmers being somewhat tenacious of their Scotch plows and other heavy implements that have found favor in the old country, even although the low price at which many of these lighter implements can be obtained is somewhat of a consideration Such exhibitions, however, have the effect of bringing practical men into contact with those varied models, and will undoubtedly tend to their introduction, wherever it is considered judicious to do so." The conclusion of which is that the handy American machines exhibited made a most favorable impression on the Canadian farmers.

ALLEN'S MOWER vs. McCORMICK'S REAPER.

MESSRS. EDITORS.—Absence from the city has prevented my previous perusal of the article on "American Reapers in Europe," published in your excellent journal of Sept. 3d and 17th.

Mr. McCormick is undoubtedly right in respect to the trial on the Imperial Farm of Fouilleuse, in France; but if any *mowing* machine of Messrs. Burgess & Key's manufacture took a prize there, it must have been undoubtedly the "Allen," as the only mower they make is of this patent, and not the McCormick patent. The latter machine of their manufacture is simply a reaper, while the "Allen" is simply a mower.

In July last, Messrs. Burgess & Key's "Allen Mower" took the first prize at the Royal Agricultural Exhibition at Warwick, which is the great national society of England. At the Highland and Agricultural Exhibition at Edinburgh (which is Scotland's national society) it is reported that "as at Warwick, the machine (Allen's Patent) of Messrs. Burgess & Key made good its claim to be considered *the* machine of the day." I presume the list of prizes will appear in the *Highland Agricultural Journal* for October.

I have no doubt that all you copy (page 147 of your journal) from the *Irish Agricultural Review*, about the superiority of the "Allen Mowing Machine," at the exhibition of the Royal Agricultural Society of Ireland, held last July at Dundalk, is correct; for, as I say above, Messrs. Burgess & Key manufacture no other mowing machine (to my knowledge) except the "Allen," and consequently could exhibit no other.

As soon as I can get an official report of these interesting matters, I will communicate the same to you; in the meanwhile, I think the above will correct the misunderstanding which seems at present to exist among us in regard to the "Allen Mower" and "McCormick Reaper." A. B. ALLEN.

New York, Sept. 20, 1859.

SOUTH CAROLINA FORESTS DYING.—The Laurensville (South Carolina) *Herald* furnishes the following curious item:—"We have noticed a considerable amount of dead and dying timber on the roads in the lower portion of the district, and heard accounts of its extension to a considerable extent in that direction. The dying is not confined to any particular kind or class of trees, but small bushes as well as large trees show their dead, yellow and withered leaves, which give the woods rather a sad calico appearance. Whether or not this is to be attributed to the late severe draught, we do not know, but it is ascribed generally to this cause."

GOLD FISH.—These beautiful fish, which were first brought to our country from China, and once kept in glass vases as objects of curiosity, have now become quite numerous in several of our rivers. In the Potomac, large shoals of them may be seen sporting in the silvery waters, and they are quite common in some of the creeks which feed the Hudson river.

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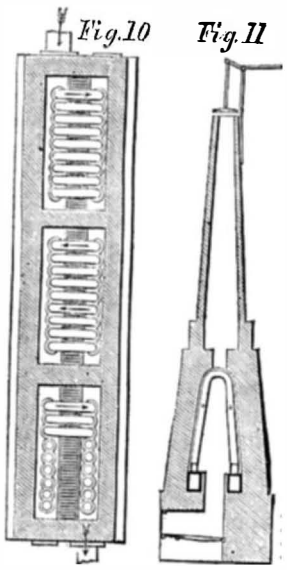
HOT-AIR OVENS FOR IRON FURNACES.

[Continued from page 204.]

With the increasing dimensions of the blast furnaces, and greater consumption of blast, ovens of larger capacity now became necessary. To meet these requirements, the first step was to place two ovens, on the bent tube principle, either "end on" or "side by side," one against the other; the blast being conducted, by means of a "stop," from the hot end of the first oven into the cold end of the second, and after reversing the latter, it entered the furnace. This arrangement, with the double oven, was found to be a great improvement on the original single oven, materially increasing the uniformity of temperature of the blast, yet not involving a fully proportionate increase in the consumption of fuel. In some cases the same plan was further extended, as in Figs. 10 and 11, which show the ordinary Staffordshire long oven first erected about 1837. This may be called a triple oven, having three compartments. Of the two modes, the one called the "side by side" setting was perhaps the better, although, generally, the "end on" mode was adopted, as shown in Fig. 10. In the "side by side" setting, all the flange joints were exposed outside the ovens, and were therefore at once accessible for inspection and repair; and, in addition, all the firing-holes were brought to one end of the oven. There was a little more friction, however, in this case, from the blast having to traverse round a bent pipe in passing from the first to the second oven; whereas, in the "end on" setting, it passed direct into the main of the second compartment.

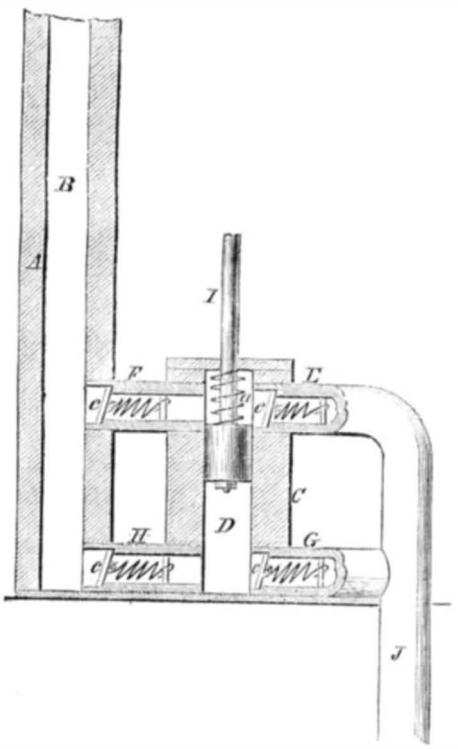


One great drawback, however, to all these ovens was found to be that, as a general rule, the liability to fracture increased in a much higher ration than the mere arithmetical proportion between the number of pipes in the single oven and the number in the double or triple ovens. This may be partly accounted for by the increased temperature maintained towards the hot ends of these ovens, which always increases the liability to fracture, and partly by the much greater number of strains to which the joints and pipes were subject from the greater length of main and the corresponding irregularity of heating. It was further remarked that numerous fractures took place, especially at the hot end of the ovens, during the period of the morning and evening castings, when, for the time, the blast had been taken off the furnaces. For some time this fact was a great annoyance, and its cause a mystery. However, by a careful consideration of the operations going on in the oven, both the cause of the annoyance and the remedy for it were discovered. It will be seen that, up to the period of casting, the blast was rapidly passing through the oven into the furnace, taking up from the inside of the pipes throughout its progress the heat slowly percolating through from the outside. On shutting off the blast, any further abstraction of heat from the inside of the pipes by the passage of the blast ceased; and, in consequence, although the damper of the oven might be closed down, which was not always attended to, a large unabsorbed accession of heat took place in the outer portion of the pipes. The numerous fractures were, therefore, with reason, attributed to the sudden and irregular expansion occasioned in the pipes at that time; and the remedy, which being exceeding simple, was yet not discovered for some years, consisted in removing the escape-valve of the blast-engine from the cold to the hot end of the oven, by which alteration, whether the blast was on or shut off from the furnace, a regular current was maintained through the oven as long as the blast-engine was at work. At the hot end of the oven, a useful addition was also made by fixing a valve which opened inwards when the blast was shut off from the oven or the blast-engine was standing, thus forming a ready vent for the escape of any sulphurous or other gases, which occasionally during those periods are sucked in, and, by their explosion, frequently jar both joints and pipes.

The long oven (Figs. 10 and 11) consisted of 25 pipes, with 1,200 square feet of heating surface, and 126 square feet of fire-grate, and was capable of maintaining the blast for six tuyeres, at a temperature of 600° Fah. In general, however, ovens of this description could not be kept tight for any lengthened period, but required a thorough repair once or twice a year. These frequent repairs necessitated one improvement, till then generally overlooked, but of great practical value, especially where several ovens were at work behind a range of furnaces, namely, the insertion of stop-valves, one at the cold end and the other at the hot end of each oven, whereby that oven could at any time be completely isolated from the general range of repairs, without disconnecting any of the pipes. These valves were originally mere circular disks, turned by a handle fixed on a center spindle, similar to the old-fashioned throttle-valve of a steam-engine; subsequently, at the hot end of the oven especially, slide-valves have been substituted; for, with the great heat and pressure of a heavy blast, the old disk-valves used occasionally to stick or be blown out of shape, and so become leaky; the slide-valves answer admirably. These valves also give a ready and simple mode of testing the state of repair of each oven, from time to time; for, by shutting off each oven alternately, and watching its effect on the speed of the engine, the leakage per oven can be observed with great exactness. In large works, without such a means of detection, leakages to the extent of 500 or 1,000 cubic feet of blast per minute would frequently take place for months without any certain means of tracing them.

[To be continued.]

HARTZLER'S IMPROVED PUMP.



In Paris, there is a class of men who make a living by carrying water up the narrow stairways of the high lodging-houses. They are huge, sturdy fellows, and are famed for the skill with which they wind their way up, without ever spilling a drop of the water in the halls or on the floors of the rooms. In this country we have hundreds of devices for raising water by machinery, one of which is represented in the annexed engraving, and is claimed by the inventor to be the best and cheapest, as it is the latest, of all the plans for this purpose.

I is the piston-rod, and D the inside of the cylinder in which the piston works. J is the pipe which communicates with the well, and B the discharge-pipe. The four valves, *c c c c*, are held in their places by spiral springs. As the piston descends, the valve in G is closed, and the valve in H is opened; and the water is forced from the cylinder, D, through H into the discharge-pipe. At the same time, the valve in F is closed, and the valve in E opened, and the water is drawn from J through E, into the cylinder, D. When the piston ascends, this water is forced out through F, and the cylinder, D, is filled through the pipe, G, thus making a double action, and keeping up a constant flow.

The inventor states that, by attaching a hose, water may be thrown over a three-story house, or to a distance of 100 feet horizontally, at the rate of a barrel per minute. Of course, this would depend on the size of the pump, and the amount of power applied.

The patent for this pump was granted to Enos Hartzler, July 25th, 1859. Persons wanting further information, may address Enos Hartzler & Brothers, Smithville, Ohio.

A NEW AERIAL CHARIOT.

A new candidate for public wonder has appeared in England in the person of Viscount Carlingford, who has constructed a machine for flying, "like an eagle in the air." The form of this machine, or chariot, as the inventor terms it, is something of the shape of a boat, extremely light, with one wheel in front and two behind, having two wings slightly concave fixed to its sides, and sustained by laths of half hollow form, pressing against them, and communicating their pressure through the body of the chariot, from one wing to the other, and supported by cords, whose force acting on two hoops nearly of an oval shape, hold the wings firmly in their position, using a force that cannot be less than 10 tuns, on the principle of corded musical instrument. The chariot is provided with a tail that can be raised or lowered at pleasure, and which serves for giving an elevating or declining position, and worked by a cord that communicates into the interior of the chariot, which is drawn forward by an aerial screw of peculiar construction. The wings of the chariot are covered with a net work, of a lengthened square shape, which produces the effect of birds' feathers when the machine floats on the air, covered with silk, at which time may be seen its progression with the points forward and the same backwards, by which no pocket, as it were, can be formed by the pressure of the silk on the air.—*Philadelphia N. A. Gazette.*

A WORD FOR THE FRANKLIN INSTITUTE.—The Philadelphia *Ledger* says:—"Many of our citizens will regret to learn that the Franklin Institute will not be able to have an exhibition this Fall, owing to the want of a suitable building for that purpose. It was supposed that the institute would have been able to erect a building of sufficient size ere this, for exhibition purposes, in which the large cabinet of the society could be seen to more advantage, and better accommodations be provided for the splendid library, which now numbers from 8,000 to 9,000 volumes, many of them on the arts and sciences, and elegantly illustrated. In architecture, civil engineering, geology, encyclopedias and dictionaries, and antiquities and the fine arts, the library is especially valuable. Some of the works were obtained at considerable cost, and are to be found in but few libraries in the country. That such an institution, possessing so many advantages to our mechanical and manufacturing population, should have been so long—over thirty years—in the small and badly lighted building it now is, does not speak well for the liberality of those most interested. The annual subscription for males is but three dollars, which not only entitles to the use of the library and reading-room, but admission to all the lectures, which are delivered three times a week for twenty-one weeks. They are chiefly on the arts and sciences." From the *Ledger* we also learn as follows:—A stated meeting of the Franklin Institute was held on the 15th inst. at the Hall, Seventh-street, above Chestnut. The Committee on Arts, of the last exhibition, reported an award of a first premium to John F. Mascher for his railway timing clock; also, the same to Messrs. Appleton, Tracy & Co., for American watches made by machinery."

BOOTS AND SHOES MADE BY MACHINERY.—Messrs. Kimball & Robinson, the well-known boot and shoe manufacturers at South Brookfield, Mass., are, as we learn from a correspondent, just completing a new factory for their business, 190 feet long, 40 feet wide, four stories high, and are putting in a 40-horse power engine to drive the different machines used in the factory. This is another of the many remarkable strides which machinery is making in the industrial arts. What would the illustrious shoemaker, Roger Sherman, think, could he but appear once more among the living and behold a boot and shoe manufactory driven by a 40-horse steam-engine? Farewell strap and lap-stone!

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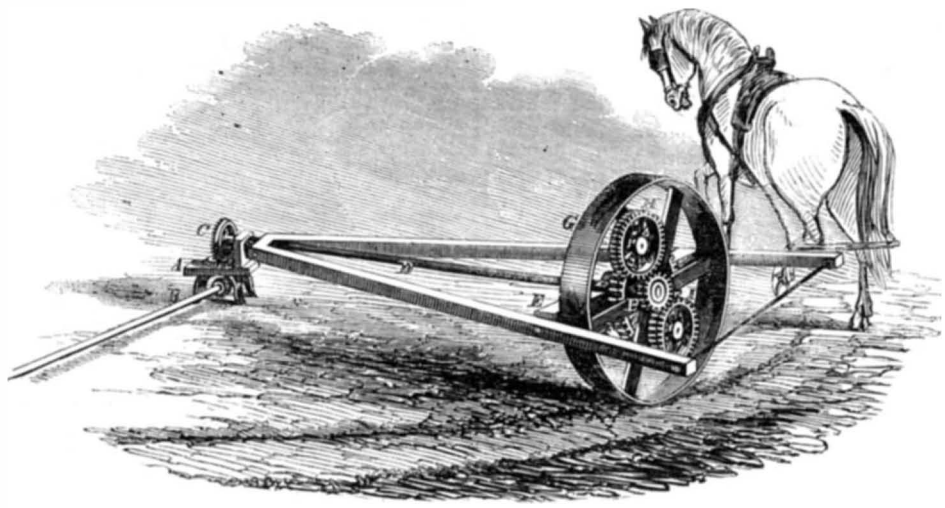
IMPROVED HORSE-POWER.

A "horse-power" is a prime motor for driving subordinate machinery, and it occupies the same place on a farm or in a small factory that a steam-engine or water-wheel does in other cases. The agent of motion is animal force, and the modes of applying it are as various as the amplifications of steam and water engines. It is one of the oldest of motors, and one of the most necessary; and the many improvements made of recent years in it afford evidence that different circumstances call forth new adaptations and arrangements of mechanism, as in this case, which tend to render this class of motors more useful and more economical for several applications.



COLTON'S IMPROVED HORSE-POWER.

The "horse-power" illustrated in the annexed engraving is the invention of Albert B. Colton, of Athens, Ga., and the improvement embraced in it consists in arranging a stationary driving-gear upon a triangular frame placed centrally with the main driving wheel, so that the hub of this gear shall form a bearing or axle for the driving wheel, and the box of it a bearing for the horizontal main shaft; also arranging a series of spur gearing on either side of the main wheel, so as to communicate a swift rotary motion to a vertical shaft, from which the power is transmitted by belts, &c., to drive the machine for threshing, grinding, churning, sawing, or any purpose whatever.

A is a plate and low standard frame to support the machinery on the floor. In this frame is supported a short vertical stud shaft, with a bevel gear on its top, and one on its under side. The under bevel pinion gears into another on the inner end of the secondary horizontal shaft, B, and gives motion to the latter, which is carried under the track to any place desired, and from a pulley on its outer end motion is communicated to any other machinery that is to be driven. C is a bevel wheel on the inner end of the main horizontal shaft, D, which is supported in a journal-box in standard-frame, A. The latter is formed of such parts, and secured in such a manner by bolts and screws that it can he easily taken apart and put together, so as to render it very convenient as a portable power. The shaft lever, D, is composed of three pieces connected together in triangular form. To the crow-brace, E, is secured a spur wheel, F, which has a hollow hub, through which the main shaft, D, and in which it is sustained, passes. Upon the hub of wheel, F, the large traction ordinary wheel, G, is fastened. On the outer end of this hub is an annular collar, which can be removed at pleasure by unscrewing the box-nut which holds it in place, for the purpose of detaching the wheel from the hub when required. On the end of shaft, D, is a pinion which is shown in the figure between the wheels, H I, which actuate it. These two wheels are secured on shafts which have bearings in journal boxes, and they have pinions on the other end which take into a large toothed wheel, F. A rapid motion is by this train of gearing thus communicated to the cencentral pinion, P, on the outer end of main shaft, D, which is thus revolved with a very rapid motion, although the pace of the horse, which is attached to an arm on the angle-bar, may be very moderate. As the horse travels round, the large traction wheel on the ground rotates, and communicates rotary motion through wheel, F, to the intermediate gearing described, and thus revolves the shaft, D, communicating double motion to the wheel, C, on the inner end, which gives motion to the secondary driven shaft, B. To prevent slip for some purposes, the traction wheel may have its face cogged.

In some situations and for certain purposes, the gearing at the inner end may be arranged to be carried above, such as to the ceiling of a shop instead of below on the ground. The principle is the same in both cases. This traction arrangement is very simple and effective for obtaining a very rapid motion on a horse-power, and it no doubt will meet with that consideration which it deserves from all those interested in this most necessary and useful class of machines.

For more information, address Mr. Colton, as above
Patented May 24, 1859.

THE AURORA AND COSMICAL PHENOMENA.

The Boston *Journal*, of the 12th ult., after speaking of the electric disturbances coincident with the aurora of the 28th of August (already noticed by us), says that on the 19th of February, 1852, when a similar coincidence was noticed, there was at the time an eruption of Mauna Loa, the great volcano on Hawaii, on the Sandwich Islands; and that on the 17th of December, 1857 (the same day on which the great earthquake occurred in Naples), a brilliant aurora was observed in the neighborhood of Boston. A learned correspondent sends us the extract from the *Journal*, with the following remarks:—

MESSRS. EDITORS:—In the article from the Boston *Journal*, the attention of scientific observers is called to the possible connection of the aurora borealis, and other magnetic disturbances, with the physical condition of the earth. It is a truly interesting and important subject of inquiry, and recent observations are tending very strongly to show the probability of such a connection. The theory of Professor Olmstead seems, as justly stated by the editor, to hardly cover the relations of these phenomena with the earthquake and volcanic action which is noted so frequently to coincide with disturbances of the magnetic-needle and with auroral displays. The activity of scientific men is now so great in Europe and America that it is difficult for common readers to keep posted in the particulars of these delicate researches and discoveries, since they are published in various languages. Several German and French philosophers have lately occupied themselves with the study of the phenomena; and we are not without one close observer, at least, in our own country. So far as the history of the physical sciences at present show, Boston itself has the lead in discovery in this department of study. I have been favored with the perusal of a letter from an eminent French *savant*, who, in speaking of the subjects under consideration, says: "I inform you, also, that Dr. Ami Bone, of Vienna, in Austria, has published a work which seems to have some analogy with that of Dr. Winslow. Its title is, 'The Parallel of Earthquakes, Northern Lights and Terrestial Magnetism, and their Connection with the Plastic Condition of the Earth and Geology.'" (*Rep. of K. K. Academy, Nov.*, 1856.) I believe, however, that Dr. Winslow, in publishing his "Principle of Variation of Density in the Matter of the Globe as it moves in an Ellipse around the Sun" (*Proceedings of Boston Society Nat. His., Feb.*, 1854), has proved his right of priority. In April, 1855, we find a memoir, by the same gentleman, in the published transactions of the California Academy of Natural Sciences, entitled, "Causes of Tides, Earthquakes, Rising of Continents, and Variations of Magnetic Force," in which the results of his observations for many years, and the largest generalizations on these important subjects are clearly and succinctly set forth. In summing up this memoir, he says: "Cosmical magnetism is a planetary force produced by the constantly varying intensity of the forces of the molecules which, in the aggregate, constitute the planetary masses; and terrestrial magnetism (as a consequence and secondary principle) is a power radiating from every point of the globe, and generated within it through its orbital relations to the solar center (its orbit being an ellipse and the sun fixed in one of the *foci* of the ellipse), whereby, it being at different distances from the sun at different periods of the year, the number and intensity of terrestrial phenomena of all sorts, transpiring in the air, ocean, solid crust and molten interior, differ accordingly." And as a consequence of his theory, he continues: "If all these phenomena are studied by physicists from a different point of view than that from which they have hitherto been studied, I believe the most remarkable advances in every department of physical science will rapidly be made, and a new world of knowledge opened to future generations of a meteorological, geological and astronomical character, of the value and extent of which it is not now possible for us to conceive."

Thus, it seems the suggestions of the Boston *Journal* have been already anticipated by scientific students, both in this country and in Europe. The appearance of Donatti's comet, last year, presented such marked illustrations of the truth of Dr. Winslow's deductions that Professor Pierce, of Cambridge, declared at Springfield, last month, his mathematical convictions of the existence of the cosmical repulsion as an equal (if not greater) force in the phenomena of the celestial bodies with that of gravitation; although, two years before, at Montreal, he discarded all ideas of such a force as purely speculative. And it is singular that the facts, as suggested by the *Journal*, seem to obtain more confirmation by the occurrence of a destructive earthquake at Sorcia, in Italy, about the time of the grand auroral display of Aug. 28th.

OBSERVER.

TO PROTECT ANIMALS FROM FLIES.

MESSRS. EDITORS:—Your correspondent who wishes to learn of something that will prevent flies from pestering horses and cattle, will find that a wash prepared by steeping walnut leaves in water will do it to his satisfaction. A gallon or more should be manufactured at a time, and made strong, and placed in the stable for daily use. Sponging the animal over once in the morning will answer for the day. EXPERIENCE.

Dalton, Mass., Sept. 20, 1859.

THE ALBERT COAL.—We have received a letter from F. Macdonald, Esq., agent of the Albert Mining Company, in which he states that our correspondent, L. A. R. (on page 151 of the present volume of the SCIENTIFIC AMERICAN) was in error regarding the locality of this mine, and also in respect to the companies which make oil from the coal. The mine is in Albert county, New Brunswick, about five miles from Peticodiæ river, at the head of the Bay of Fundy; not in Prince Edward's Island. The coal is not used at Hunter's Point, L. I., but only at the Kerosene Oil-works, South Boston, Mass.; Portland Kerosene Oil-works, Portland, Maine; and at the New Brunswick Oil Company's Works, St. Johns, N. B. No other companies have had any of the Albert coal this year. The above three companies are under contract with the Albert Mining Company for the whole product of the mine until January, 1864.

C. P. Garman, of Dayton, Ohio, sends us the following recipes:—

LINIMENT FOR SPRAINS, &c.—One pint spirits of alcohol, 1 drachm of camphor, 2 drachms of opium and 2 drachms of spirits of turpentine.

COUGH SIRUP.—One ounce alecompane, 1 oz. comphry, 1 oz. hoarhound and 1 oz. wild-cherry bark. Put these in 1 quart of water, and boil down to 1 pint. Add 3 cups of honey, 1 cup of sugar, and 1 table-spoonful of sweet oil. Take one table-spoonful every two hours.

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RELIABLE HISTORY OF STEAM NAVIGATION.

Our able cotemporary, *The Commercial Bulletin*, is publishing a series of articles on the "History of Steam Navigation," and, in doing so, quotes in conjunction with much reliable information, the case of Blasco de Garay as being among, if not the very first of the inventors of the steamboat. We are well aware that it is claimed for the Spaniard that he invented a steamboat in 1543, and that he experimented with it in the port of Barcelona; and this assertion has been set forth as a matter of reliable history by several authors. It is a singular fact, that this claim was never heard of before 1822, long after steamboats had become quite common in America and England, and it is no less singular that the authenticity of such claims should have been admitted by any author. A few years ago, as published on page 83, Vol. XIV, SCIENTIFIC AMERICAN, these claims were proved to be founded on spurious data, by Mr. John McGregor, of London, who went to Spain and examined the national archives at Simancos, where the record of Garay's experiments were stated to be kept. He found two letters written by Blasco on the subject of propelling boats, but instead of propelling them by steam, they only gave the particulars of moving vessels in the port of Barcelona, by large paddle wheels turned by 40 men. Mr. McGregor says: "After careful and minute investigations at Simancos, Madrid and Barcelona, I cannot find one particle of reliable evidence for the assertion that Blasco de Garay used a steam-engine for marine propulsion.," It is high time that this mythical steamboat of the sixteenth century ceased to occupy a place in history. We refer our cotemporary to Mr. McGregor's notes (published as above stated) which are the result of profound research.

STEAM—ITS HEAT AND PRESSURE.

MESSRS. EDITORS:—On page 133 of the present volume of the SCIENTIFIC AMERICAN, under the head of "Explosions in Steam Boilers," an extract of Mr. Hyatt's paper, read before the Association for the Advancement of Science, is given, and in which it is stated that steam at 868° Fah. is equal to 960 lbs. pressure on the square inch. It is a dangerous practice for any one to put down things which he knows nothing about in the same category with those which he probably understands. Such steam as Mr. Hyatt speaks of is entirely unknown; but supposing it really did exist under the circumstances stated, I find that one cubic foot of water will produce but 49.39 cubic feet of such steam.

The total power in steam increases uniformly from a suppositious zero—272.48° C. for every degree—and is equivalent to lifting one pound 154.402036 feet in hight. This makes the total power in the above steam equal to lifting one pound 113,794 feet, which being divided by 2.4 times the pressure in lbs. per square inch, gives the number of volumes of the steam as compared with the water it contains at the boiling point.

This is a very curious result, of the correctness of which any one may satisfy himself by multiplying the pounds pressure per square inch by the number of volumes into which water expands to become steam, when it will be found that the products, divided by the number of degrees, will always give the same dividend. The ordinary tables are not sufficiently accurate to give identical results, but if you take Regnault's tables you will have identical results from zero to 230° C. (456° Fah.) and 404.447 lbs. per square inch, which is quite as far, I believe, as we are justified in going in our statement about the temperature and pressure of steam, that being about the extent of our knowledge on the subject. That the total power in steam should be equal to the products of the pressure arising from expansion of the water in becoming steam is not surprising, but that the increment should be equal for every degree might not have been expected, when we consider how unequal the elements of calculation are. I believe this to be my own discovery; I made it several years ago.

I think there must be some mistake in reporting Professor Henry's remarks. He could hardly have asserted that the sum of the latent and sensible heat of steam in the same in all cases, or that Dalton discovered it. This law is known as the law of Watt, which the researches of Regnault prove to be incorrect. At 32° Fah. the total heat in vapor is 1,092° Fah.; at 212° Fah. it is 1,147° Fah.; and at 446° Fah. 1,218° Fah. High pressure steam is not, therefore, "just low pressure steam compressed, as you have stated, and which I hope you will correct, as you are doubtless anxious to give reliable information to the people. T. P.

[We are perfectly well conversant with the fact that the tables of Regnault do give more combined heat in high than low pressure steam, but the difference is so small that we deem it perfectly proper to consider high pressure steam just low pressure steam forced into less space. —EDS.

THE COAL-OIL MANUFACTURE.

MESSRS. EDITORS:—Perhaps no branch of industry has created so much attention of late as the manufacture of oil from coal and bitumen. Seduced by a report that this new and wonderful branch of chemical technology was profitable over and above all imagination, a great many people of all persuasions and professions, intent to realize a large fortune in a very short time, have ventured their capital in this enterprise. We have before our eyes the remarkable spectacle that, where, two or three years ago, only one or two manufactories existed, struggling hardly under the difficulties of the new process, we have now 20 or more mammoth concerns. We naturally ask the question, how have those new enterprises fared, and what are their prospects? The answer to the first of these questions is not a very flattering one; for, of all the numerous establishments, none has paid a dividend on the money invested, some have failed, and others were only able to prevent such a catastrophe by the wealth and determination of the persons who were engaged in the enterprise. The second query may be responded to as follows: If the stockholders or owners of the several manufacturing concerns have sufficient capital to keep up until the oil is fully introduced and appreciated, and until they have learned to make a uniformly good article, then this money invested in the manufacture of coal-oil will bring them eventually a fair interest, provided the material used and the location of the establishment will permit the production of good oil at a profitable rate. I am sorry to add that a good many concerns work such a viciously bad coal that they would do better to sell their retorts for old iron immediately, than to continue to produce an unsaleable article.

As to the actual value of coal-oil and paraffine, as illuminators, there can be no doubt; and I am perfectly satisfied that they will drive out of use most all other illuminating agents except gas. Manufacturers, however, will have to be satisfied with a fair profit on the capital and skill invested; those who dreamed of golden mountains will wake up to find them turned into cinders and ashes, and the evil odor prevailing will perhaps clear up their minds as to who it was that metamorphosed their gold and silver into the above-named worthless dust.

* * *

Cincinnati, Ohio, Sept. 13, 1859.

DEATH TO COCKROACHES.

MESSRS. EDITORS:—Your published answers to correspondents in the SCIENTIFIC AMERICAN always have peculiar charms for me. I invariably scan them closely for the brief, pointed and practical advice they contain.

In your issue of the 10th inst. you reply to W. Z., of Pa., "There is no substance known to us which is an effectual extinguisher of the cockroach." Now, permit me to say there *is* such an "extinguisher," and it is very simple. Cockroaches love saccharine matter above all things, and they cannot swim, or at least they cannot get out of a vessel containing water sweetened with molasses or sugar. Therefore, take a common wash-bowl or tin wash-pan, fill it about half full of water, and sweeten it with a gill of molasses or half a pound of sugar (molasses preferred). Set the bowl or pan against the wall of the room or cellar infested by the imps, and they will flock to the beverage like topers to whisky. Every one that drinks is sure to drown. I know not why, but it is so, as I have seen a quart of them caught thus in one summer's night. It is better to place the vessel in a corner of the room as the imps can then descend by two walls to their sweet groves. Mr. T. H. Clark, of this district, is entitled to the merit of discovering the plan for destroying the universal pest, and I take delight in communicating the information for the benefit of all unfortunate bipeds who may be suffering from the nuisance.

I congratulate you heartily upon your continued prosperity. I am sorry to say that I only lately subscribed for the SCIENTIFIC AMERICAN. It recently contained one little fact which amply repaid me, and which alone was well worth the price of five years' subscription. Henceforth I shall take your journal until life's voyage terminates. Through its columns, as well as by private letters, you give better and fuller information, gratis, than I can get elsewhere "for love or money." Long may you flourish to serve the public, who are beginning to appreciate your labors. G. D. F.

Edgefield, S. C., Sept. 24, 1859.

DEFLECTION OF BRIDGES, ICE, &c.

MESSRS. EDITORS:—In your number of September 17th, a correspondent argues that "iron or ice will bear a greater weight passing over it at slow speed than at a greater," and states that the "rule of going slow is always observed in passing over an unsound part of an embankment." Perhaps the cautious movement of a train under such circumstances is advisable in order to detect and avoid any danger that may appear. There is more rack and danger to a bridge, undoubtedly, by passing trains over it at a high speed; but so long as the bridge remains in place, and especially when its condition is shaky or precarious, the quicker the train gets over it, the less danger there is in going down with it. The speed at which the train was moving at the time of the late accident at Schaghticoke, on the Albany and Vermont Railroad, was the only salvation of any part of the train. If it had been running slowly, the whole would have sunk into the gulf; but as it was, its speed carried the engine across, and the cars only went down with the bridge.

How is it with ice? When the first pellicle forms on our ponds, about Thanksgiving, what boy that ever slid on shoe-leather, or emulated the bird's flight on skates, does not know he would break through the instant he allowed his weight to settle upon the ice, and that nothing but the utmost effort and celerity will enable him to cross the crystal frost-bridge in safety?

Have we not read how—

"Swift Camilla scours the plain,
Flies o'er the unbending corn, and skims the main?"

But what would have become of Camilla if she slacked her flight, folded her pinions, and allowed her weight to settle, unbuoyed by the rapidity of motion? Methinks she would soon find herself in closer contact with "Mother Earth" than one of her etherial birth would fancy. A. M. G.

Albany, N. Y., Sept. 19, 1859.

A VERY GOOD SUGGESTION.

MESSRS. EDITORS:—Having seen some time since a remark about the bad accommodation there is in this city for posting letters, I have been thinking that all the up-town portion of the city could be accommodated with a system of posting within a few minutes' walk of all. The mode would be to attach a box to each of the cars on the different avenues; the conductor to receive the letters and charge one cent for carriage; a receiving-office to be established at the City Hall to deposit the letters in after each trip. I think it would be a very business-like way, and I think the one cent per letter would pay the railroad companies, as they would have to provide nothing but for receiving the letters.

W. H.

New York, Sept. 20, 1859.

CURE FOR INSECT BITES.

MESSRS. EDITORS:—In your issue for September 3d, I noticed the "Remedies for Insect Bites;" and, while they may be very good, I would suggest to any one who may have use for such remedies, that if they will take equal parts of common salt and gunpowder, and moisten them with strong vinegar, and apply the same to the sting of a bee or wasp, or even the bite of a snake (saying nothing of gnats, &c.), they will go no farther for a remedy. H. M.

New York, Sept. 26, 1859.

A SURE STYPTIC.—C. C. Lyon, a dentist of Maspeth, L. I., writes to us as follows:—"Observing recently a case of death caused by hemorrhage from the extraction of a tooth, the following should be universally known as an infallible remedy:—Make plaster of Paris into the consistence of soft putty, and fill the cavity. It will soon become a solid plug."

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FERRIES WANTED IN ENGLAND.

Americans who are accustomed, when crossing rivers, to walk into a spacious saloon, supplied all around with comfortably cushioned seats, and if in winter, warmed by steam or anthracite, or, remaining seated in a carriage, drive on board, amidst other vehicles and loaded teams, the spacious deck of a ferry boat, and having arrived at the opposite side of the river, pass on to the shore as if they had been crossing an ordinary bridge, are but little aware of how far we are in advance, in inland steam navigation, of the old countries. I therefore suspect that the following slip, cut from the London *Weekly Times*, will amuse, and very likely surprise many of your readers, as it indicates rather a disposition to ridicule the practicability of the system of ferry-boats, which, with us, have been so long in use, even before the days of steam, as they were then called "team-boats," the paddle-wheels being turned by horse power, but which, now, the English entertain an idea of as "steam-bridges."

"The Liverpool *Albion* states that some years ago a scheme was proposed for connecting the the two sides of the Mersey by a tunnel, after the manner of that tunnel which passes under the Thames, a contrivance at present used as an arcade for the sale of gingerbread and children's toys. Sometime afterwards an aerial bridge was suggested, flying across from St. Georges Church to Oxton Hill. The Mersey Board has come down to a very unromantic proposal, to have a steam-bridge, by which carts and carriages can be passed across the Mersey, unloaded and unyoked. This scheme we are informed by Mr. Stewart, is not only quite practicable, but it is really a beautiful one—a term by which, we suppose, Mr. Stewart means to express that it will answer in an admirable manner the purpose for which it is designed; but it will cost about £70,000."

With the advantage of the American system of ferries, Birkenhead and Rock Ferry, on the opposite side of the Mersey, would be to Liverpool what Brooklyn and Williamsbugh are to New York, and a more liberal supply of the valuable products of Cheshire would reach the markets of Liverpool; but the ferry-boats now in use are capable of carrying passengers only, and in a very uncomfortable manner; they being exposed on an unsheltered deck, unless content to stow away in a miserable hole below; but not calculated to carry teams and cattle, there being a boat arranged especially for the latter purpose, on which the vehicles and horses are placed separately, or unyoked, and the whole process of getting them over the river, performed in a slow, awkward and expensive manner.

London, too, needs five or six good ferries over the Thames, below London Bridge, as there is no means whatever of crossing the river in this manner below that point, the tunnel being useful only for pedestrians; hence London Bridge presents almost one continual jam of teams, omnibuses, &c., whilst the same distance of river below, and still in the midst of city traffic, if measured around New York, would pass at least 10 splendid ferries.

American boats are also wanted on the Thames, for carrying passengers up and down the river, for those in use are alike rude and ill-adapted to the purpose; having no accommodations but an unsheltered, narrow deck, and being built of slim, steamship form, they draw too much water for the upper parts of the river, unless very small, and this too, where a boat properly shaped for the purpose would carry, at the rate of 15 miles an hour, five hundred bales of cotton, and as many passengers secured from any inclemency of weather, with plenty to eat and drink, and comfortable lodgings.

Englishmen don't seem to appreciate, or even understand the adaptation of boats to river navigation; it is singular, too, that so industrious and presevering a people should overlook the vast commercial advantages that would result from the introduction of such a system in in their colonies, particularly the long rivers of the East Indies.—*Corr. Philadelphia Ledger.*

GASES IN WATER.

The gases which are found to exist most frequently in water are oxygen and nitrogen (but in different proportions to those which prevail in atmospheric air), the hydro-carbonic, carbonic, and hydro-sulphuric acid gases. They occur in variable proportions, dependent at times on the atmospheric pressure, at others on a countless number of local causes connected with the state or the movement of the atmosphere. Thus in the case of river waters it has been found that the quantity of air in solution is normally about 1-25th of the volume of the air itself, and that it is composed of from 31 to 32 parts of oxygen to from 68 to 69 parts of nitrogen. The proportions of air thus held in solution differ, however, in the respective seasons of the year, and they are greater when the temperature is low that when it is high. It is the oxygen which varies the most in quantity, for the nitrogen seems to be less affected by external causes, such as the solar light and heat. Spring waters invariably contain less oxygen than river waters; and in some cases the air which enters into their composition consists almost entirely of nitrogen—a circumstance which may account for the unwholesome character of some spring or well waters, and which are said to cause fever and ague. It is a common opinion that the more deep and confined the spring, the more healthy are its waters; this is not so in very many cases, but the reverse. The water which bursts from the rock, catching the oxygen as it falls into its stony basin, is generally the most healthy. The hydro-carbons so often to be found in soft waters are among the most injurious of the gases the waters are able to dissolve. They are furnished by the decomposition of vegetable and animal matters under the influence of light and heat; and the *marsh gas*, the proto-carbureted hydrogen, is the one which is given off with the greatest abundance under such circumstances. The waters again which filter through the soil around gas-pipes are very likely to take up these hydro-carbons, and it therefore becomes important to take precautions against the occurrence of any such danger in case of the supply to a well in a city.

Carbonic acid gas occurs in all waters in variable proportions, and either as free gas, or in the form of the bicarbonates of the bases. In stagnant waters it is less abundant than in those which are in movement; for it would seem that the vegetation and the animal life of the former tend to fix the carbonic acid gas at the same time that it gives rise to an elimination of oxygen. The free carbonic acid of springs is dependent upon the temperature; as this increases, so does the gas diminish in proportion. All river waters contain from 0·02 to 0·03 in volume of carbonic acid; and it becomes, therefore, an interesting subject of inquiry to explain the source of this enormous supply. In spring waters the quantity of this gas varies in a remarkable manner, whether considered in its free or in its combined state; and it has given rise to some of the most interesting phenomena connected with the chemistry of the globe. Carbonic acid in water renders it a solvent of great power, and to this agency geologists attribute many great changes which have taken place on the crust of the globe. Water charged with carbonic acid dissolves rocks, and carries them in solution from higher to lower levels, and finally deposits them in the beds of lakes and seas, either as sediment or precipitates. The rocks which are deposited from the water in which they were suspended are of every variety of clay, sand and gravel, and when compacted by great pressure become marls, shales, slates and sandstones. Many rocks which now raise their lofty heads on high once flowed in crystal streamlets.

SPLITTING SHEETS OF PAPER.—The London *Mechanics' Magazine* describes a mode of splitting paper so as to leave the least quantity of fiber compatable with leaving the ink undisturbed. If the sheet is sized, soak it in hydrochloric acid, much diluted with water, till the size is rendered perfectly soluble in moderately warm water; and when well washed press it gently between blotting-paper. While still damp, lay it between two sheets of smooth, firm paper, previously coated with a solution of isinglass, or other clear size on one side, press the sheets well together, and leave them till perfectly dry. Then by carefully separating the outer sheets, the middle one will be evenly ruptured or otherwise, accordingly as one sheet is bent more than the other during the process of separation.

In *Silliman's Journal of Science*, for September, Mr. David A. Wells, of Troy, N. Y., furnishes a comprehensive account of the late meteor in that neighborhood, the explosion of which was also heard distinctly throughout Berksire county, Massachusetts, and even in parts of Connecticut and Vermont. He calculates that it was heard over an area of territory 100 miles wide, east and west, and 800 long, north and south.

A COLUMN OF INTERESTING VARIETIES.

"Patent" means *open*; "Letters Patent" are letters for the perusal of all. By Letters Patent, that is, open letters, the Queen of Great Britain grants lands, honors, and franchises. In this country the term is applied to the documents by which inventors are granted a monopoly of their inventions for a limited period; and to those by which the government conveys the public lands.....A San Francisco writer, of late date, says the following are about the rates of wages now paid: carpenters, from $4 to $7 per day; bricklayers and masons, from $4 to $6: blacksmiths, wheelwrights, machinists, painters, tinsmiths, from $3 to $4½; common laborers, $3; farm hands, from $30 to $40 per month, and found; servants, from $25 to $40 per month, and found; cooks, from $30 to $60.....Some idea may be formed of the enormous sums of money expended in the purchase of pictures by the wealthier classes in England, from the fact that the collection of the late Lord Northwick has produced no less than £95,725. The sale extended over 18 days, and was attended by dealers from all parts of the world. The picture of the "Birth of Jupiter" which cost his lordship £80, was knocked down at £1,000. The picture of "St. John," by Carlo Dolci, from the Lucien Bonaparte Gallery, was knocked down for the sum of 2,010 guineas.....A new kind of bread, known as the "aerated bread," is now made in London, in the manufacture of which no fermentation is used. The process consists in forcing ready-prepared carbonic acid, by means of suitable machinery, into the water with which the dough is prepared, then mixing the flour, water and salt together in a highly condensed atmosphere. From the mixing-apparatus the dough is received in the baking-pans, and passed into the ovens without being touched by the hands. By this means the constituency of the flour is left both unchanged and uncontaminated, the loaf being absolutely pure bread.....James VI, of Scotland, was James I, of England. It was during his reign (in 1607) that the first permanent settlement was made in the United States, at Jamestown, in Virginia .....A very able writer in the last *London Quarterly Review*, after discussing the whole subject in a very intelligent manner, deliberately comes to the conclusion that if the French should invade England with 150,000 or 200,000 men, the whole military power of Great Britain could not prevent the taking of London. His principal recommendation is the adoption of the militia system of the United States. And yet the "London Quarterly" is the publication that talks about "the vulgar democracy of America," and thinks republics always were failures and, in the nature of things, always must be failures in every respect.....Tobacco-growing in California is commanding attention. The stalks are about seven feet high and the leaves finely developed. The plants are growing as an experiment and certainly a more superb growth was never produced.....The Ordnance Bureau of the United States Navy Department has lately ordered 500 Joslyn's breech-loading fire-arms, and 900 Sharpe's rifles.....If any of our country readers who have occasion to kill a sheep or other animal, will cut open the heart carefully, they will find the valves arranged with wonderful and beautiful ingenuity..... 27 pounds of prussic acid consist of 14 pounds of nitrogen, 12 pounds of carbon, and 1 pound of hydrogen.....The interior of the earth is one mass of molten matter; it is estimated that the thickness of the hardened crust on the outside bears no larger proportion to the whole mass than the thickness of an egg-shell does to the mass of the egg..... Several of the stars which we see in the sky are shown by the telescope to be double stars, revolving about each other..... As a general rule in this part of the country, when a cobble-stone or boulder is found, if we travel in a north-easterly direction, we shall come to a ledge of similar stone, from which no doubt the boulder was broken.....The side wheels of the *Great Eastern* are driven by four engines, two on each crank, and the two cranks are connected by a friction clutch.....The English Patent Office had a surplus revenue above its expenses in 1858 of £7,814. 11. 2..... An explosion occurred at a percussion-cap manufactory in England, on the 28th of July, by which the woman engaged in mixing the fulminating powder was blown into so many small pieces that no fragment of her remains larger than a person's hand could be found.....The hight of the Washington Monument is to be 600 feet.

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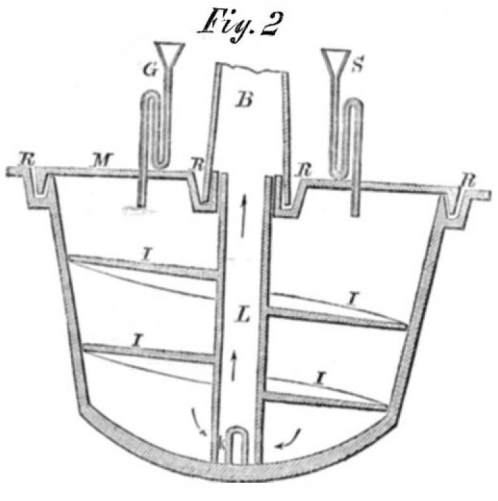
IMPROVED GAS APPARATUS.

Gas is the most beautiful and convenient agent of artificial illumination. It can be made from any of the hydro-carbon substances, but some of these are much better suited than others for this purpose. Resin oils and coal are the most common materials used; the two former for villages, public buildings, factories and houses; coal for cities. On a large scale, the common apparatus for making coal-gas is very perfect; and is entirely different from that required to make gas from resin or oils. Most coals contain ammonia and sulphur, which have all to be removed from the gas by absorbents; therefore, in making coal-gas, lime purifiers and other agencies involving elaborate apparatus are required. The gas made from resin or resin oil is more dense than that of coal, and one cubic foot of it affords as much light as two feet of the other. As it contains no sulphur, no lime purifiers, &c., are required in the apparatus, and it is therefore more simple, compact and suitable for villages, public buildings and houses. Its more general adoption, however, has been prevented by several defects in apparatus which has been employed, two of which we may mention. The first is a difficulty in keeping the retort clean from the adhering of hard carbon to its surfaces; the second consists in the passing over of a light condensable vapor of a very disagreeable odor, which is liable to become fluid in pipes and meters. By the gas apparatus illustrated in the accompanying engravings these evils are obviated and a more brilliant light from the gas secured; because a chemical liquid is gradually fed into the retort, which keeps it clean by preventing the adherence of the hard carbon to its surfaces, and also because all the vapor which is usually condensed in the pipes is converted into a permanent gas of a high illuminating power, from which it has received the name of "sunlight gas."

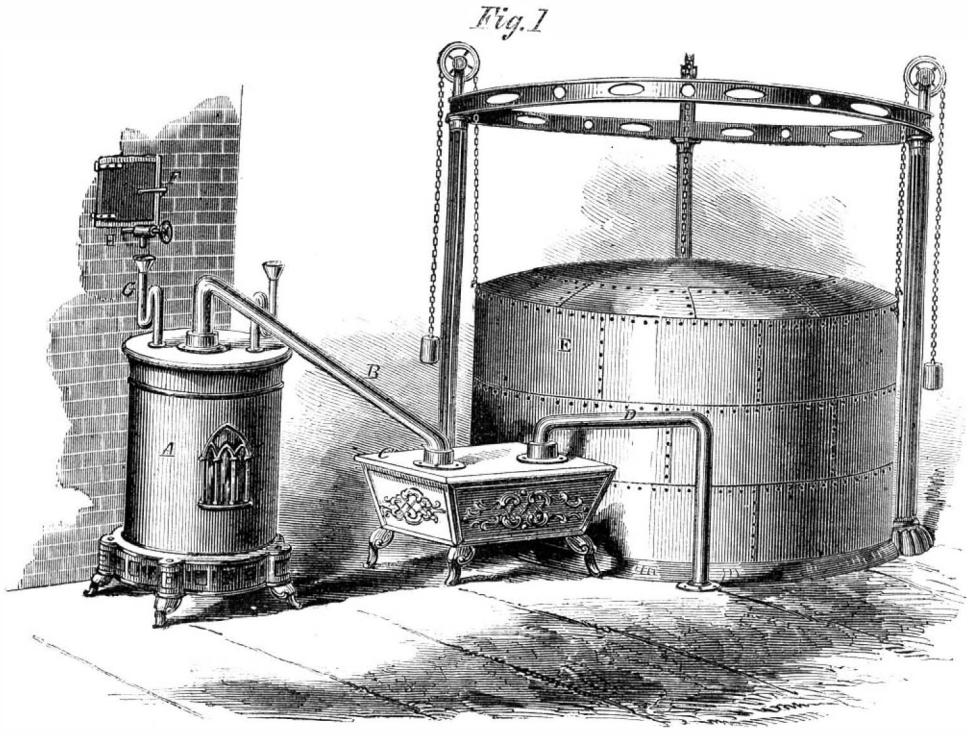
This apparatus is adapted for making the gas from



resin, resin oils, tallow or refuse grease; but it is specially designed for resin because it is the cheapest, the most cleanly and convenient substance which can be used. This much we have stated, by way of introduction, to convey a clear idea of the nature of the objects of the improved apparatus; and the following description of the figures will explain the offices and construction of the various parts.

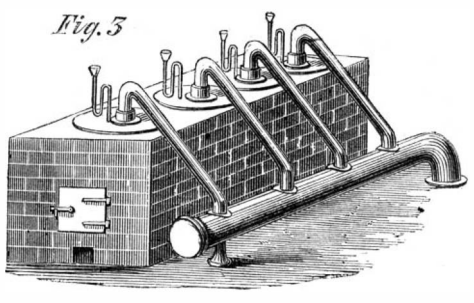
Fig. 1 is a perspective view of an apparatus suitable for a private house; Fig. 2 is a vertical section of the improved retort, and Fig. 3 a view of a bench of retorts for making gas for a village or large factory.

A is a stove to which the retort is applied for generating the gas. B is a pipe from which the generated gas is conducted to the cooler, C, which contains water. D is a pipe from which the washed gas is conducted to the gasholder, E, from which it is conveyed by suitable pipes to the house for burning in the usual manner. The resin is heated in a receiver placed in the chimney at F, and converted into a fluid state, and from this it is suffered to drop regularly into the siphon, G, in the retort by the graduated faucet, *h*. The interior of the retort is formed with a series of inclined or spiral surfaces, I I, and the melted resin falls on the first or top



MARSH'S GAS APPARATUS.

one where the heat is lowest, then it spreads and passes down over the whole inclined surfaces, and in its progress it becomes exposed to higher degrees of heat, thus subjecting the gas as it is formed to a very elevated temperature—a necessary condition. It then passes out to the conducting tube, L, by the opening, *k*, of which there is one on each side of the pipe. By this operation the gas is exposed at last to the very highest temperature in the retort at the bottom, and all the volatile matter is converted into permanent gas. From the retort pipe, L, the gas is conveyed by pipe, B, to the cooler, C, Fig. 1, thence to the receiver for distribution. The chemical liquid for preventing the carbon adhering to the surfaces of the retort, and thus tending to keep it clean, is allowed



to drop into it by the siphon, S. The lid is made with a flange or rim which is retained in a receptacle, R, containing molten lead; and the pipe, B, is retained in a recess of the same kind. The other end of this pipe is retained in a water-joint in the cooler, C. The latter joint can sustain a pressure of six pounds, the joints of the retorts sustain a pressure of two pounds. Not a screw or bolt is used in forming the joints, yet the whole are so tight that no escape of gas is permitted.

A single coal fire, as in a coal stove, melts the resin, and effectually heats the retort so as to make the gas. A small retort, costing $10, it is stated, will make as much gas as the common kind, costing $60. One of these apparatus is used by Mr. R. D. Cook, at the Monteagle Hotel, Niagara Falls, and he says it embraces the principle of keeping itself clean so perfectly that he can run it until it is burned up, making at the rate of 300 cubic feet of gas per hour, and it is never obstructed by residuum. A retort of the form represented by Fig. 2, only 15 by 14 inches in size, will make 300 cubic feet of gas in one hour. In other retorts bricks and other substances are packed to expose the resin oil and gas to an extensive heating surface. The inclined shelves in this one obviate this kind of packing and secure better results. By this apparatus as much gas is obtained from a barrel of resin as from a barrel of resin oil; the former costs from $1.75 fo $2, the latter from $5 to $7. For villages, factories, hotels and other public buildings, also private dwellings, this simple gas apparatus seems to be well adapted in every respect, both in regard to the simplicity, durability, cost and compactness. The patent for the retort was issued in August, 1858; and since then patents have been secured, through the Scientific American Patent Agency, in England and France, and other European countries. Other retorts for making gas from resin require to be cleaned every few hours because of the carbonaceous matter that adheres to the surface, which prevents the heat from acting on fresh resin. The advantages secured by having one which does not require such trouble to operate it are self-evident.

For further information address Alfred Marsh & Co., No. 241 Broadway, New York, where the working apparatus may be seen. The proprietors are experienced in the manufactured of all kinds of gas apparatus—coal as well as resin and oil—and contract for the same.

PRESENT STATE OF THE PATENT OFFICE.

The long lists of patents which appear under the proper head in our paper from week to week evince a most commendable activity in the Patent Office. All persons who have business to transact with the Office, or who feel an interest in the progress of improvements in this country, must rejoice at the efficient manner in which this public bureau has been conducted for the last five years. Inventors especially have cause for congratulation in the fact that they can secure for so small a sum, and with so little trouble, that protection to their ingenuity which is extended to them by the existing statutes, and the liberal construction which is given them. Within our recollection, a patentee was looked down upon as a pitiable, crack-brained being, who was too lazy to earn his daily bread at an honest avocation, or as one who was endeavoring to cheat a living out of the public by his superior wits. But within a few years a wonderful change has come over the public mind in regard to patent property and inventors, and now there is no class of the community more highly esteemed. They receive a double respect—that which is commanded by genius, and that which is obtained by wealth; for many inventors have, of late years, grown rich out of their inventions. We could name scores of men who have made large fortunes from their patents within the last six years, and hundreds of mechanics, each of whom has realized a handsome competence already, and who has made his patent the means of establishing a large and prosperous business. The change in public feeling of which we speak is practically shown in the increased facility with which patents are sold. If an invention is good, if it has an actual money value, there is now no difficulty in finding a purchaser.

Inventors would do well to secure the products of their ingenuity to themselves while the machinery of the Patent Bureau is in such good working order. We have, almost daily to listen to the tale of some poor inventor, who laments that he had not, years ago, taken out a patent for a certain invention, "as such or such a person has since realized a fortune for the same idea." In patent matters, delays are always dangerous.

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Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada.

Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No Traveling Agents employed.

VOL. I., NO. 14.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, OCTOBER 1, 1859.

SCIENTIFIC PROGRESS.

PROGRESSIVE science is the prominent characteristic of the present age. We live in an era of transition, in which we behold the customs of centuries overthrown and the conditions of social life modified and changed in a thousand ways. The discoveries of man applied to new and useful purposes have placed a power in his hand far transcending the fables of antiquity. It is but fifty-two years since the first successful steamboat floated on our waters; it is only twenty years since the first locomotive struck its iron hoof on our railroads; but twenty-five years since the first reaper was brought into public use; only fifteen years since the first line of telegraph was put up, and but thirteen years since the first American sewing machine was constructed. The revolutions which have been effected by these agencies—and by many others of nearly equal importance which we could mention if space permitted—are so great that when we reflect upon them, it seems almost impossible they could have been accomplished in the short space of fifty-years. Our new systems of public transit, our improved means of public communication, of manufacturing, engineering and mechanical operations, embrace discovery upon discovery in sufficient magnitude and array to raise a column from the summit of which we may gaze down upon the preceding centuries of physical progress, and behold them appearing like foot-tracks in the desert. We have great reason to feel grateful for the manifest achievements and progress which have been made in our day, but it would be the hight of foolishness to feel satisfied with what has been done, and take up a position of self-admiration and inertness. From ancient history we learn that several nations—Egyptians, Assyrians, Greeks and Romans—accomplished, at successive periods, great works and became great powers. They exhibited much intellectual and physical activity during their dominance, and then they became sluggish and finally degraded. They all seem to have attained to a position where the conclusion settled down upon them that they had done enough; and as a consequence, by reposing on their laurels, they soon sunk into senility. The most civilized nation that would do so now would rapidly inherit the same fate, but we think no fears of such a result need be entertained in the present age of progress. The printing-press will prevent this; it is the mighty agent which keeps the public mind in fermentation and prevents it from stagnating. "Knowledge runs to and fro;" the human intellect is quickened and the successful application of one principle but paves the way for its higher application in some other department. We have a remarkable exemplification of this in one of the greatest—if not the very greatest—of the undertakings of the age, viz., the steamer *Great Eastern.* When Stephenson had completed the ponderous iron tubular bridge over the Menai Straits, and when its mighty strength had been demonstrated to the wonder of the engineering world, Brunel was impressed with the idea that this was the very principle of construction most applicable for gigantic ships; and in the progress of ten years his grand conception has been realized. Its form and combination were not the results of abstractions, but experiment and strict induction. Its strength is so great that it may be suspended (like the tubular bridge) upon its extremities between the waves; while other large ships, if so positioned, would break asunder by their own weight. Who could have imagined, fifty years ago, that the sun would have been employed to paint the human form, the lofty cataract, the romantic dell? or that the moon would take its own portrait? Or who would have conjectured that the red bolt of the thunder-cloud could have been guided to convey the transactions of senates and the results of famous battles, hundreds of miles through the sea, and over mountains and valleys, in a few seconds of time? Yet such results we have seen accomplished in our own day; and greater than these may yet be expected. Photography has made wonderful progress both as a science and an art, and yet it is but in its infancy. Nature has not yet suffered the artist to transfer her glowing colors to his prepared paper, but she may not always deny him this power.

But with all the achievements and progress of the age, let no one imagine that the field of discovery and improvement has become confined; it is still boundless as the sea and free as the winds. A few weeks ago (see page 177 of our present volume) we directed attention to improvements required in motive agents for city railroads; and we are happy to state that several of our cotemporaries have taken up the subject and responded to our suggestions. A hundred other subjects, requiring peculiar adaptations, are still open to the inventive world; and chemistry, light, heat, magnetism and electricity have many rich secrets in store as rewards for the unwearied and faithful investigators in physical science.

THE NATURAL AND THE ARTIFICIAL.

A correspondent—Thos. J. Lane, of Boston—suggests that some patriotic person should make a series of experiments in order to determine what color of a building will most completely protect the interior from the changes of temperature of the external air. If Mr. Lane will examine the proper books he will find that the whole matter of the reflection, absorption and transmission of heat has been investigated in a far more thorough and satisfactory manner than it would be by the series of experiments which he advises. We commend to him especially the researches of Melloni. The explanation of the mystery of polar animals being covered with white fur which reflects the heat, while the negro and other tropical animals generally have dark or high-colored coverings which absorb the heat, is simply this: the heat of our bodies is principally supplied by the chemical combination of oxygen and carbon in the lungs, and as the same colors which reflect the most heat emit the least, animals in cold climates are furnished with white fur to keep the heat in, while the skin of the negro is dark to allow the heat to escape.

The same correspondent has some original ideas in regard to art. He thinks that all real beauty is based wholly on utility. If he means any other utility than the utility of the beauty itself, the idea is absurd. Of what use are the spots on a butterfly's wing, or the countless variations in the petals of the pansy? There is great utility in beauty; it is a source of the purest, most refined and most exalted enjoyment, and thus contributes largely to the sum of human happiness. The wonderful adaptation of the eye to the flower and of the flower to the eye, producing exquisite pleasure by the mere arrangement of form and color, is one of the most striking proofs of the thoughtful care with which the Creator has made abundant and overflowing provision for the happiness of his creatures.

Our correspondent also objects to imitations of nature, such as vines and leaves, in ornaments for stoves, fences and buildings. He says that what is natural should be wholly natural, and what is artificial should be wholly artificial, mechanical or geometric. In regard to the illustrations which he cites in proof of his strange proposition, we agree with him. We have never seen a rustic fence or piazza made of poles with the bark upon them, which we did not think was a failure as a work of art; and the ornaments of our stoves, fences, &c., are in general sufficiently hideous. But if our correspondent should see the oak-wreath sculptured over the entrance to Trinity church, in this city, he would probably change his opinion. Indeed, his rule, in order to be true, should be exactly reversed. Natural forms, if they are well imitated, are the very ones which are always most pleasing to the eye. In the production of beauty, nature is unapproachable by the highest art, either in form or color. Delicate indeed would be the chisel which could reproduce the petals of the rose or the stamens of the fuchsia. And we may ask—

"What skillful limner e'er would choose
To paint the rainbow's varying hues,
Unless to mortal it were given,
To dip his brush in dyes of heaven?"

OLD WORLD CONSERVATISM.

In another column will be found an article entitled "Ferries Wanted in England," copied from the Philadelphia *Ledger*, which forcibly illustrates the slowness of the English in adopting any improvements from abroad, and especially from this country. While Americans engaged in calico-printing, in ship-building, in agriculture, in every department of industry, are always on the alert to adopt any improvement from whatever source it may come, the Frenchman, the German, and the Englishman, each deems his own nation so superior that it has nothing to learn from any other. This contrast between Americans and Europeans has been exemplified a hundred times.

Some years ago the Messrs. Hovey, of Boston, embarked in an extensive series of trials to produce an improved strawberry; it was said that they fruited over 2,000,000 of new seedlings, and out of these they selected two remarkably large and fine varieties. Has any one ever heard of these being cultivated in Europe? On the other hand, our nurserymen are so eagerly on the watch for any new varieties of fruit that may be originated in Europe, that, when the "Victoria Currant" was first produced, the Messrs. Parsons, of Flushing (L. I.), paid $30 for the first bush which they could procure.

How slow were the English in adopting from this country the sharp bow for ships, and especially in dispensing with the heavy bowsprit on steamers! Like the Chinese, they look upon the Americans as "outside barbarians," and like the Jews of old, they ask, "Can any good thing come out of Nazareth?" The comparative absence of this feeling among the Americans was most strikingly shown by Mr. Stevens when he visited England with his famous yacht. While the *America* was lying at Liverpool with the challenge flying from her mast-head to sail against all the English yachts for $50,000, Mr. Stevens noticed a gaff on one of the English vessels which he thought was better than any other that he had seen. Notwithstanding the extraordinary circumstances of the case, and though he knew that the attention of all England was upon his movements, he immediately went to one of the ship-yards and ordered a gaff like the one which he had observed, and the *America* had that English gaff at the top of her sail when she won the great race. This greater readiness of Americans to adopt improvements, from whatever source they may come, is one considerable cause of our more rapid advance in the arts, and in material prosperity.

BURROUGH'S PAPER-CUTTING MACHINE.

A short time since we noticed the issue of a patent, through our agency, to E. Burroughs, of Rochester, N. Y., for a paper-cutting machine. We have since seen a full-sized working machine at the Inventors' Exchange, 37 Park-row, which is most perfect in its operation, and fully answers the wants of the trade, especially of job printers; being adapted to cutting card-board as well as other kinds of paper, and of capacity sufficient to cut pieces 28 inches in width, and of any length. A cut, with full description, will soon appear in this paper, meanwhile, the machine will be on exhibition at the Fair of the American Institute, and a model can be seen at the rooms of S. A. Heath & Co., 37 Park-row, this city.

IMPORTANT PATENT CASE.

[Special Telegraphic Dispatch to the Scientific American.]

UNITED STATES CIRCUIT COURT, NORTHERN ILLINOIS.
Before Judges McLean and Drummond.

SEPT. 19.—*Obed Hussey vs. Cyrus H. McCormick.*—The opinion of the Court, delivered on the 19th inst., at Chicago, held that Obed Hussey's patent for the combination of the open slotted finger and scolloped sickle is a good valid patent, and has been infringed by McCormick. Second decree for account and injunction against McCormick granted. The case was argued by Harding, of Philadelphia, for Hussey; and by Keller, of New York, for McCormick.

McCormick has succeeded in getting his patents reissued, as will be seen by reference to the List of Claims published on another page. This proceeding doubtless involves something important to all makers of such machines

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THE FOUR ORGANIC ELEMENTS.

OXYGEN, HYDROGEN, NITROGEN AND CARBON.

I.—OXYGEN.

Nine pounds of water consist of eight pounds of oxygen and one pound of hydrogen; 342 pounds of red-lead consist of 310 lbs. of lead and 32 pounds of oxygen; 100 lbs. of atmospheric air consist of 77 lbs. of hydrogen and 23 lbs. of oxygen. One of the most curious facts in nature is the change in the properties of substances which results from their chemical combination. Oxygen and hydrogen combined together assume the liquid form; but oxygen on being combined with lead becomes solid, and the lead is no longer malleable, but may be pounded into powder. Oxygen, when separate or uncombined, has yet been obtained only in the gaseous state; but it is found in by far the largest quantities, in combination with other substances, forming either solids or liquids. It has strong affinity for more substances than any other of the elements. There is a great difference among them in this respect; gold and platina are not disposed to combine with other things, they are old bachelors, but oxygen is a perfect Brigham Young—it wants to marry everything that it meets. It surrounds us on every side, but generally wedded to some other substance. It forms a portion of almost all the rocks which we see, and which make up the crust of our globe. Of 50 lbs. of marble, 24 lbs. are oxygen. In the three constituents of granite it forms 40 per cent of the feld-spar, just half of the mica, and more than half of the quartz.

All changes in chemical combination are accompanied by alterations of temperature. When oxygen especially combines with any other substance there is always a great exhibition of heat, and generally of light. Almost all fire is produced in this way. Burning a body is generally simply oxydising it. This was the great discovery of Lavoisier. He found that when a body is burned in oxygen the body is increased in weight precisely as much as the oxygen is diminished. If we take a tight jar full of oxygen gas and drop a piece of sulphur into it, the sulphur burns with intense brilliancy and disappears. But if we weigh the jar we find its weight exactly the same as the sulphur and the jar of oxygen added together weighed before. The sulphur was not destroyed by being burned, but combined with the oxygen to form sulphurous acid, which is a transparent and invisible gas. If we heat the end of a piece of iron wire red-hot and introduce it into a jar of oxygen gas, the wire burns with the most brilliant scintillations, throwing down black scales. If we collect these scales and weigh them, we find that for every 117½ ounces of iron that were burned, we have 141 ounces of iron scales; and if we weigh the jar of oxygen, we find that that has lost 24 ounces of its weight.

When Lavoisier announced his discovery, all the chemists in Europe immediately supplied themselves with delicate scales; and the weight of various substances, as compared with each other, has now been ascertained by different observers thousands of times. A young chemist would ask no better passport to universal fame than the detection of a material error in one of these weights.

The combustion of a gas or of a volatile substance, like sulphur or phosphorus, produces flame; while, if the substance is solid and not volatile, it burns without flame.

The heat of our bodies is kept up by slow combustion or oxydation. The air, on entering the lungs, is spread through thousands of cells where it is separated from the blood by exceedingly thin membranes, through which the oxygen of the air is absorbed by the blood. Here it enters into combination with the carbon which has before been brought to the blood from the food taken into the stomach, burning the carbon as literally and truly as the coal is burned in the grate, and producing the same substance as the burning of the coal produces, that is, carbonic acid gas. Our lungs are perfect furnaces, which warm the body by a constant though slow combustion.

EUROPEAN PATENTS.—In connection with their American Patent Agency, Messrs. MUNN & Co. attend to procuring patents in England, France, Belgium, Russia, Prussia, Austria, Spain, and in all other countries where laws for the protection of inventors exist. Persons desiring to consult with MUNN & Co. can do so freely, and be supplied with a circular of instruction on the subject. A pamphlet of advice how to procure American patents will also be furnished on application.

A SOUTH-EAST RAIN.

There is one property of the atmosphere which is the cause of many of the phenomena of the weather; that is the increase of its capacity for moisture, with the increase in the temperature. Warm air will hold more water than cold air. As the wind moves along from the south-east across the warm water of the Gulf Stream, its temperature is raised, and it absorbs the vapor which is constantly rising from this tepid current. Continuing on its course across the cooler tract which intervenes between the Gulf Stream and the land, the temperature of the wind is reduced so that it cannot hold all the water that it has absorbed, and it deposits it in the form of rain. Our fishermen have a maxim that a south-east wind never blows 12 hours without bringing rain. We have known exceptions to this rule, but we believe it is more generally true than any other among all the signs of the weather.

The same property of the atmosphere, in connection with the trade winds, explains the dry climate of Peru. As the wind, coming across the ocean from the east, strikes the land of South America, it is cooled and deposits its moisture, giving to the north-east portion of South America the most rainy climate on the face of the earth. As the wind continues on its course up the side of the Andes, it grows cooler and colder till, as it rolls over the frozen summit, almost the last drop of moisture is squeezed out of it, clothing the peaks in everlasting snow; and when it tumbles down the western slope of the mountains, and experiences the warmth of the lower elevation, its capacity for water is increased and it becomes greedy for every drop of moisture it can find; in other words is a very drying wind. The consequence is, the inhabitants of Lima sometimes do not see a drop of rain for a whole year.

From the neighborhood of Behring's Straits, a cold ocean current rolls in a south-eastern direction along the western coast of North America. Opposite San Francisco this current, when once observed, was found to have a temperature of 54° Fahrenheit. In the summer, the intense heat of California makes the land warmer than this cold water, and when the breeze comes in from the ocean, instead of depositing its water in rain, it becomes very drying, drinking up every drop of moisture it can find. In the interior of California, the sun rolls daily over the blazing sky unobscured by a speck of cloud, from early in May till the first of October. In the winter the land becomes cooler than the water, and then rain is formed.

The same property of the atmosphere, in connection with the wind currents, also explains the dryness of the climate of Egypt, in which country rain is never known.

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page.

GRAIN SEPARATOR.

The object of this invention is to separate oats and other foreign substances from small wheat, after the latter has been separated from sound heavy wheat by any of the known implements in use. This invention, although capable of general application, is more especially designed to be used with improved grain-separating devices which were patented by J. L. Booth, March 8th, 1859, and July 12th, 1859. The invention consists in the employment or use of a series inclined of zig-zag screens and boxes having a proper shake-motion communicated to them, and used in connection with a fan and blast spout, whereby the desired end is attained. The inventor resides at Cuyahoga Falls, Ohio.

REEFING SAILS FROM THE DECK.

Capt. G. B. Cornish, of the New York and Liverpool packet-ship *Emerald Isle*, has patented an improvement in the Cunningham rig, consisting principally in the employment for the purpose of reefing square sails, by rolling them upon their yards, of a single reef pennant applied in the form of a parbuckle, around the middle of a yard, in combination with an improved method of suspending the yard and providing for its rolling, by which means he obtains a method of reefing from the deck of a vessel which possesses several advantages over the method heretofore used. The invention further consists in a certain method of fitting an apron to the central opening in the sail which is rendered necessary by rolling the sail on the yard.

IMPROVED LAMP.

The object of this invention is to economize in the construction of lamps, render them more durable than usual, and make suitable provision whereby the flame may be supplied with a requisite amount of warm oxygen to feed the flame and at the same time the top or cap be kept in a sufficiently cool state to permit the same to be detached by the fingers for the purpose of trimming the wick, or supplying the fount with oil. The inventor of this device is John L. Drake, of Cincinnati, Ohio.

BOOK-BACKING MACHINE.

This invention consists, firstly, in the employment, for shaping the backs of books, of a longitudinally divided roll or pair of segments operating across the back from the center towards both sides. It consists, secondly, in certain mechanism for operating the book-holder, to make it present the book to repeated operations of the divided roll, and gripe it tighter before every repetition of the operation; and it consists, thirdly, in certain mechanism for moving the divided roll out of the way to permit the insertion of the book in and its withdrawal from the holder. The credit of this invention is due to G. H. Sanborn, of Boston, Mass., and John E. Coffin, of Portland, Maine. The former is the assignee of the patent.

HYDRO-CARBON LAMP.

The object of this invention is to obtain a lamp that will burn, for illuminating purposes, hydro-carbon fluids varying in density, and which require different supplies of oxygen to support proper combustion. The invention, although it may be used for burning all hydro-carbon fluids, is more especially designed for burning coal oils and by a certain mechanism intended to be rendered capable of such adjustment as to burn both the light and heavy oils with a white and brilliant flame. The inventor of this device is Halvor Halvorson, of Cambridge, Mass.

THEMIOMETRIC REGULATOR FOR HEATING APPARATUS.

In the various kinds of apparatus for heating air for warming buildings, many kinds of regulators have been used, but mostly of two classes; one class being controlled by the temperature of the apartment, or one of many apartments, that is warmed, and the other by the temperature of the heater itself. The first class may serve the purpose very well when the building contains but one apartment, but in a dwelling-house or building containing many apartments to be warmed by the same apparatus, it is obviously almost impossible to regulate the temperature of all the appartments by that of any one of them; and the second class can never operate successfully in a climate of very variable temperture, as they tend to preserve a uniform temperature of the heater, without regard to the temperature of the incoming cool air. L. W. Leeds, and C. Vaux, of New York City, have patented a regulator which is said to be more perfect than any operating upon either of the above mentioned systems; it consists of a vessel which they term a secondary heater, having no communication with the prime heater by which the air for warming the building is heated, but exposed at the same time to the heating influence of the primary heater, and to the cooling influence of the current or currents of incoming cold air, and containing water or other fluid, which, by the expansion and contraction due to variations in its temperature, is caused to operate upon a piston or into equivalent connected or geared with a regulating-cock or valve in the pipe which supplies steam or other heating agent to the primary heater, in such a manner as to cause the supply of such agent to the heater to vary in vessels with the temperature of the incoming cold air.

EXTENSION CASES.

CORN-SHELLER. — Thomas D. Burrall, of Geneva, N. Y., has applied for an extension of the patent granted to him, Dec. 6, 1845, for an improved Corn-Sheller. The petition is to be heard at the Patent Office on the 21st of November next.

STEAM BOILERS.—James Montgomery, of New York City, has applied for an extension of his patent for improved Tubular Boiler, issued Dec. 26, 1845. The day of hearing is set down for Dec. 5th at the Patent Office.

COOKING-STOVES.—Samuel Pierce, of Troy, N. Y., has applied for an extension of his cooking-stove patent which was granted Dec. 6, 1845. The case will be heard at the Patent Office on the 14th of November.

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FOREIGN SUMMARY—METALS AND MARKETS.

The great event of the past week has been the departure of the *Great Eastern* down the river Thames on her first trial trip to sea. Fears were entertained that when the fastenings were loosened she would not be very manageable, but it is stated that the very first turn in the river demonstrated that she was as completely under control as any river steamer. Captain Harrison, her commander, and one of the most experienced river pilots, directed her motions, and Captain Comstock, who navigated the *General Admiral* to Russia, assisted voluntarily in the management. As she proceeded down the river, crowds assembled at various points and gave vent to their admiration by repeated cheers. She was towed down on this occasion, and anchored on the afternoon of Sept. 7th at Purfleet, and on the subsequent day weighed anchor and started for the Nore under her own engines. The London *Times* states that with the use of only two-thirds of her power, and under very bad trim for sailing, she run at the rate of 15 statute miles, and against a strong tide, in 58 minutes. J. Scott Russell was on board directing the operations of the machinery, which worked with great ease, scarcely a vibration being perceptible. Thus far the *Great Eastern* has given evidence of being the fastest steamship in the world. This she ought to be, as, according to scientific deduction, ships increase in speed according to their size, if the model is good and the power proportional to the tonnage. On Sept. 8th she left the Nore and steamed off majestically for Portland (England), where was to remain until Sept. 17th, on which day she will proceed to Holyhead, and from that port will commence her transatlantic voyage. Passengers will be taken at fares of from $90 to $125. It was anticipated that she would reach Portland, Maine, in from six to seven days after leaving Holyhead. Should this trip prove successful, the Cunard Company will at once build a vessel of equal size, although they have now in course of erection eight steamers larger than the Persia.

A small screw steamboat, called the *Little Lucy*, and only 20 tons register, built at Stockton, England, of thin steel plates, to run on a river in Brazil, has made the voyage out to that country in a very satisfactory manner. The steel plates of which the hull of this little steamer was built are only one-eighth of an inch in thickness.

The Hobart Town (Australia) *Mercury* draws attention to the bark and leaves of trees which abounds in the forests of Tasmania, as being well adapted for making paper. During certain months these trees shed their leaves and bark, which accumulate in the gulleys and dry creeks; and when the rainy season arrives, the water forms them into a thick pulp which spreads over the uneven surfaces of the water courses, and when it becomes dry, forms huge brown sheets of stiff brown paper. On several occasions we have found sheets of such natural paper in some of our American dry water courses, and from this we infer that there are leaves in this country as well adapted for making paper as those of the trees in Tasmania.

At the great annual show of the Highland Agricultural Society, lately held at Edinburgh, Burgess & Key's reaper (American) was awarded the first prize, and Bell's the second. It is remarkable that this second reaper should have been lately awarded the first prize in Belgium in preference to that of Burgess & Key's; while in the country where it was invented, the Highland Agricultural Society awarded it only the second. At another trial of reapers, lately held at Haydon Bridge, England, by the Hexam Farmers' Club, one of Burgess & Key's also took the first prize.

A rare occurrence in England—a steamboat explosion—took place on the river Tyne on Aug. 26th. The explosion occurred during a race between two boats, when the stokers were firing up with great fury to beat the opposition. One man was killed. A rigid investigation as to the cause will take place, and those who were the principle means of the calamity will certainly get punished.

The American company which has been engaged at Sevastopol in raising the sunken fleet has been quite successful in taking up no less than fourteen steamers, besides some other vessels.

Our London cotemporaries are beginning to advocate horse-railroads for that city.

PRICES OF FOREIGN METALS, SEPT. 12.

	£	s.	d.		£	s.	d.
Iron, English Bar and Bolt :—				Iron, Swedish, bars, per tun	11	10	0
In London, per tun.	7	0	0	Russian C C N D.	17	0	0
In Wales	6	0	0	Steel, Swedish Keg, nom	18	10	0
In Liverpool	6	10	0	Do. Rolled.	19	10	0
Staffordshire Bars.	7	10	0	Faggot.	20	0	0
Sheet, single,	9	0	0	Spelter	21	0	0
Double	10	10	0	Zinc, in sheets	27	10	0
Hoop	8	10	0	Copper, Tile	107	10	0
Rod, round	7	10	0	Tough Cake	107	10	0
Nail Rod, square	7	10	0	Sheathing & Bolts, per lb.	—	—	12
Shipping Iron :—				Sheet	—	—	12
Staffordshire Bars.	7	10	0	Bottoms	—	—	12½
Sheet, single	9	0	0	Old	—	—	10
Double	10	10	0	Yellow Metal	—	—	10
Hoop	8	10	0	Lead, British Pig.	22	15	0
Rod, round	7	10	0	Spanish	22	10	0
Nail Rod, square	7	10	0	Sheet	23	10	0
Iron, Rails, in Wales, cash	6	5	0	Tin, English Block, nom	136	0	0
Do. 6 months	6	0	0	Bar	137	0	0
In Staffordshire	7	0	0	Refined	142	0	0
Railway Chairs, in Wales	4	0	0	Foreign Banca	143	0	0
In Clyde	4	0	0	Straits	146	0	0
Pig No. 1, in Clyde	2	13	6	Tin Plates, Charcoal, IC, per box	1	13	0
3-5ths No. 1 and 2-5ths No. 3	2	13	0	Do. IX	1	19	0
Staffordshire Forge Pig, at the works, L. W., nom	4	0	0	Coke, IC	1	7	0
Welsh Forge Pig	—	—	—	Do. IX	1	13	0
Acadian Pig, Charcoal	8	15	0	Canada, Plates, p'r t'n	12	0	0
Scotch Pig, No. 1, in London	3	10	0	Quicksilver, per bottle	7	0	0

There has been a considerable reduction in most of the brands of iron, and tin has also fallen in price considerably. There has been no speculation in the money market to cause this change. The market is in a healthy condition and there are free purchases in all the metals except tin, which is still considered too high in price. In Glasgow the pig-iron is 52s. 9d. per tun, and the demand for it is good.

[The above are prices within three per cent discount, the pound being valued at $4.85.

New York Markets.

COAL.—Anthracite, from $4.50, to $4.75.

COPPER.—Lake Superior ingots at 23c. per lb. for cash; new sheathing, 26c.

COTTON.—Ordinary—Uplands, 9c. per lb.; Florida, 9c.; Mobile, 9c.; New Orleans and Texas, 9¼c. Middling—Uplands and Florida, 11⅛c.; Mobile, 11¾c.; N. O, and Texas, 12c. Middling fair—Uplands and Florida, 12¾c.; Mobile, N. O. and Texas, 13c. Fair—Uplands and Florida, 12¾c.; Mobile, 13⅛c.; N. O. and Texas, 14c.

FLOUR.—State, superfine brands, $4 a $4.25; Ohio, common brands, $4.20 a $4.50; do. fair extra, $4,75 a $5.20, Genesee, extra brands, $5.25 a $7; Missouri. $4.40 a $7; Canada, $5 a $5.75; Richmond city, $6.25 a $7 25: rye flour, fine, $3.50 a $3.90; corn meal, $3.80 a $3.85.

GLASS.—American Window—First, second, third and fourth qualities, per 50 feet: 6 by 8 to 8 by 10, $3.50 a $2.75; 8 by 11 to 10 by 15, $4 a $3; 10 by 16 to 12 by 18, $4.50 a $3.25; 12 by 19 to 16 by 24, $5.25 a $3.50; 16 by 25 to 20 by 30, $6 a $4; 20 by 31 to 24 by 36, $8 a $4.50; 25 by 36 to 30 by 44, $9 a $5. These prices are subject to a large discount.

HEMP.—American undressed, $140 a $150; dressed from $190 a $210. Jute, $95 a $90. Italian, $2.75. Russian clean, $210 a $215 Manilla 6¾c. per lb.

INDIA-RUBBER.—Para, fine, 56c. a 60c. per lb.; East India, 37c. a 40c.

INDIGO.—Bengal, $1 a $1.50 per lb.; Manilla, good to prime, 55c. a $1.10; Guatemala, $1 a $1.15.

IRON.—Anthracite pig, $23 a $24 per tun; Scotch, $23 to $23.50; Swedish bar, ordinary sizes, $87.50 a $90; English refined, $53 a $54; English common, $43 a $45; Russian sheet, first quality, 11c. a 12c. per lb.; English, single, double and treble, 3½c. a 3⅞c.

LEAD.—Galena, $5.75 per 100 lbs.; German and English refined, $5.70; bar, sheet and pipe, from 6c. to 6¾c.

LEATHER.—Oak slaughter, light, 33c. a 35c. per lb.; Oak, middle, 33c. a 35c.; Oak, heavy, 32c. a 34c.; Oak, crop, 37c. a 40c.; Hemlock, middle, California, 23c. a 23½c.; Hemlock, light, California, 22½c. a 23c.; Hemlock, heavy, California, 21½c. a 22c.; Hemlock, hsavy, 20c. a 21c. Patent enameled, 16c. a 17c. per foot, light. Sheep, morocco finish, $7.50 a $8.50 per dozen. Calf-skins, oak, 57c. a 60c.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

LUMBER.—Timber, white pine, per M feet, $17.50; Timber, yellow pine, $35 a $36; Timber, oak, $18 a $28; Timber, eastern pine and spruce, $17,50; White Pine, select, $25 a $30; White Pine, box, $14 a $18; White Pine, flooring, 1¼ inch, dressed, tongued and grooved, $24.50 a $25; Yellow Pine, flooring, 1¼ inch, dressed, tongued and grooved, $29 a 32; White Pine, Albany boards, dressed, tongued and grooved, $30 a $21; Black Walnut, good, $45; Cherry, good, $45; White Wood, cherry plank, $42; Spruce Flooring, 1¼ inch, dressed, tongued and grooved, each, 22c.a24c.; Spruce Boards, 15c. a17c.; Hemlock Boards, 12½c. a 14c.; Hemlock Joist, 3 by 4 inch, 12½c. a 14c.; Shingles, cedar, per M, $28 a $35; Shingles, cypress, $12 a $25; Staves, W. O. pipe, light, $55 a $58; Staves, white oak, pipe, heavy, $75 a $80; Staves, white oak, bbl. culls, $20; Heading, white oak, hhds., $65.

NAILS.—Cut at 3c. a 3⅜c. per lb. American clinch sell in lots, as wanted, at 5c. a 6c.; wrought foreign, 3¾c. a 3½c.; American horse-shoe, 14½c.

OILS.—Linseed, city made, 58c. per gallon; whale, bleached spring, 53c. a 55c.; sperm, crude, $1.25 a $1.28; sperm, unbleached spring, $1.35; lard oil, No. 1 winter, 87c, a 92c.; extra refined rosin, 30c. a 40c.; machinery, 50c. a 100c.; camphene, 45c. a 47c.; coal, refined, from $1.12 a $1.50; olive, $1 a $1.05.

RESIN.—Common, $1.60 per 310 lbs. bbl.; No. 2, &c., $1.70 a $2; No. 1, per 280 lbs. bbl., $2.25 a $3; white, $3.25 a $4.50; pale, $5.50.

SPELTER plates, 5½c. a 5¾c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5½c.

TALLOW.—American prime, 10¾c. to 10¾c. per lb.

TIN.—Banca, 32¼c. a 32¾c.; Straits, 30¼c.; plates, $7.50 a $9.75 per box.

TURPENTINE.—Crude, $3.62½ per 280 lbs.; spirits turpentine, 46c. per gallon.

ZINC.—Sheets, 7¼c. a 7¼c. per lb.

The foregoing rates indicate the state of the New York markets up to September 12th.

More foreign coal would find sale in the New York market than now reaches it. Most of that which arrives is contracted for abroad, and the supply is limited. Our American mines do not supply the Eastern market with a sufficient quantity of cannel and good bituminous coal.

The sales of cotton for the past week have been moderate, but holders do not seem to be anxious to sell.

There has been a sale of 100,000 feet of common Eastern spruce and pine at $12 and $13 per M.

The flour market is much depressed, and prices much lower this week. Ohio flour seems to have maintained its price, while most others have fallen from 15c. to 25c. per bbl. The wheat crop throughout the world seems to have been very abundant this year, which will have a tendency to keep down prices. The corn crop in the northern districts has been somewhat injured by the early frost. Holders of corn are expecting a considerable advance in its price.

ALBANY LUMBER MARKET, SEPT. 21.

The transactions in lumber during the week have been to a fair extent, without any material quotable change in prices. The demand is active for the supply of the extreme Eastern ports, which, to a large extent, can be attributed to the drought in Maine and the scarcity of lumber in that State. There is a scarcity of hemlock boards, joists and wall strips, which will continue until sufficient rain has fallen at the north to start the mills and keep them running. In other descriptions of lumber the stock is large, and the assortment good. The receipts during the past six days have fallen off materially, and many are now of the impression that, from the present time up to the close of canal navigation, they will show a large diminution compared with those of a corresponding period of last year, and that they will not be sufficient to meet the current demand. On the other hand, there are those who look for an increase, and anticipate the receipts for the season to exceed those of last year by 25,000,000 feet. The receipts of board and scantling for the six days aggregate 5,807,000 feet.

CANAL CHAIN PROPELLERS.

Our attention has been directed by Mellen Battel, of Albany, N. Y., to the chain system of propelling boats on canals, described on page 195 of the present volume of the SCIENTIFIC AMERICAN, in the column of "Foreign Matters." He informs us that this very system was tried on the Erie canal in 1822, and failed, as he believes, on account of the numerous crooks in the "big ditch." In hauling round a bend, the chains would cramp on to the point, and haul the boat ashore. He thinks that, by passing the endless chain over pulleys at the sides of the boat, near the bows, they might be operated to propel very well, and so managed as to keep the boat from running on land. In point of time, this propeller may be considered an American invention; but, so far as it relates to practical application with some degree of success, France deserves the most credit, if any. There are boats now running on the Seine, at the village of St. Ouen, near Paris, which are propelled by endless chains passing over pulleys and trailing on the bottom of the river. Such a method of propulsion we consider altogether inferior to the screw; and the late attempts to introduce it on English canals, we believe, will end in disaster.

HOW TO TEST THE QUALITY OF WOOL.—The Texas *State Gazette* says:—"Take a lock of wool from the sheep's back and place it upon an inch rule. If you can count from 30 to 33 of the spirals or folds in the space of an inch, it equals in quality the finest quality of Saxony wool grown. Of course, when the number of spirals to the inch diminishes, the quality of the wool becomes relatively inferior. Many tests have been tried, but this is considered the simplest and best. Cotswold wool and some other inferior wools do not measure nine spirals to the inch. With this test, every farmer has in possession a knowledge which will enable him to form a correct judgment of the quality of all kinds of wool. There are some coarse wools, which experienced wool-growers do not rank as wool, but as hair, on account of the hardness or straightness of the fiber."

CAST STEEL.—*L'Invention*, a journal published at Paris, contains, in the August number, a description of a process for melting steel, which it is stated has been in use in France five years, and saves 33 per cent of the cost. Anthracite coal is said to be the very best fuel for this purpose.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING SEPTEMBER 20, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

25,476.—Lemuel Allen, of Pekin, Ill., for an Improved Planetarium:

I claim the representation of the planets and their orbits suspended on a diametric rod, and capable of rotating on said rod, within a broad belt which represents the zodiac, substantially as set forth.

I also claim the arrangement of devices by which the Earth may be adjusted to represent its relative position to the Sun, and to the plane of its orbit, at any point thereof, in the manner and for the purpose set forth.

25,477.—Astley C. Ancona, of Reading, Pa., for an Improvement in Slide Valves for Steam-engines:

I claim the corrugated valve seat in combination with the cavities, c c c c, in the face of the valve, substantially the same as and for the purpose set forth.

25,478.—P. J. Ankney and Daniel McGreevy, of New Lexington, Ohio, for an Improvement in Grain Separators:

We claim, first, the oscillating hopper or trough, b, as constructed, in combination with the revolving screen, e, constructed and operating jointly as described and for the purpose set forth.

Second, We claim the combination of the screen, e, and trough and hopper, b, with the adjustable hopper or trough, h, and the spout, j, with gage, j', cut-off, k, and valve, k', the whole operating as described and for the purpose set forth.

25,479.—W. R. Axe, of Beloit, Wis., for an Improvement in Mortising-machines:

I claim the gage-plate, R', and slides, x x, in combination with the reciprocating table, W, and adjustable table, W', arranged in the manner and for the purpose set forth.

[This invention consists in the employment of a reciprocating table which is to be operated by a treadle, so as to bring the materials to be mortised or tenoned up to the chisel; said table being provided with a feed-roller actuated by a pawl and ratchet during the movement of the table from the chisel so as to feed the stile along the table as the mortising proceeds; and in conjunction with this reciprocating table is an adjustable bed-plate for adjusting the work to the chisel.]

25,480.—Horace Bertholet, of Reading, Pa., for an Improvement in Steam-engines:

I claim the peculiar arrangement of the bar, I I, in the slotted valve stem, and the connection of the arms, R R, with the cylinder-cocks, C C.

25,481.—Jonathan Bigelow, of Brighton, Mass., for an Improved Changeable Stencil:

I claim the character-plate formed at its ends as described, for the purpose specified, whether the same be swaged at one edge or not.

Also the stencil formed by the combination of said character-plates and a frame or frames, or clamps, as described.

25,482.—Peter S. Bishop, of Smithfield, R. I., for an Improvement in the Manufacture of Thimbles:

I claim the new article of manufacture described, namely, a thimble made from plated or overlaid metal, either in the common form with fluted sides, or with sides in the form of a regular geometrical figure, the whole article being substantially such as specified.

25,483.—Alpheus Bissell, of Berlin, Wis., for an Improved Washing-machine:

I claim the arrangement of the false bottom, C, cords, a a, pulleys, x x, platform, D, and cam chuck, E, with the frame, F, provided with corrugated rubbers, H H, with rollers, m m, and with levers, I I, said frame being operated by means of cranks, J J, the whole being combined and operating substantially as and for the purposes set forth.

25,484.—J. L. Booth, of Cuyahoga Falls, Ohio, for an Improvement in Grain Separators:

I claim the inclined zigzag screens and boxes, B, C, and troughs, E, having a shake motion given them, and used in connection with the revolving fan, G, and spout, H; the parts being arranged relatively with each other to operate as and for the purpose set forth.

25,485.—J. H. Boyd, of Baltimore, Md., for an Improvement in Saddle-trees:

I claim the employment of the double head or gullet plates, C and D, when the front head or gullet, D, is connected to the body of the tree by means of springs, E E, in such manner that when the straining web is attached to said head and to the back of the tree, a spring seat will be formed, substantially as set forth.

25,486.—Samuel W. Brown, of Lowell, Mass., for an Improved Steam-pressure Indicator or Alarm:

I claim the arrangement and combination of cylinder, A, rod, F, and c, tube, G, and valve, H, with each other, in the manner described, for indicating or giving the alarm with steam from the same or contiguous chamber, essentially in the manner and for the purposes fully set forth.

25,487.—Morgan Chittenden, of Danbury, Conn., for an Improved Sash-fastener:

I claim the combination of a T-shaped wedge, C, with a bolt case, B, having an opening corresponding thereto, whereby the two sashes are uniformly and closely secured together, substantially in the manner and for the purpose set forth.

25,488.—M. H. Clark, of Danville, Va., for an Improvement in Hydraulic Presses:

I claim, first, the arrangement of the water reservoir, D', force-pump or pumps, E, main supply-pipe, F, branches, G G, stop-cocks, H, and a series of hydraulic presses, A B C, for united operation, substantially as and for the purpose set forth.

Second, Arranging a leather packing-ring on a disk which is divided radially into a series of parts, and fitted loosely on a conical extension of the piston, and held in contact with said extension by means of an undivided disk which is suspended loosely so as to have vertical play on a screw or head pin of the piston, substantially as and for the purposes set forth.

25,489.—Richardson T. Clark, of Johnstown, N. Y., for an Improved Apple-parer:

I claim the combination and arrangement of the paring-knife, A, lever, g N M, spring, R, cord, L, clutch drum, K, and spring, U, with shaft, I, band, g, and pulleys, H and J, and wheels, D and E, and apple fork, B, substantially as and for the purposes described.

25,490.—V. P. Corbett, of Washington, D. C., for an Improvement in Stoppers for Preserve Cans:

I claim the arrangement of the plate, m, screw, p, conical nut, b, and disk, A, composed of two or more sections, a, when the same are used in connection with an elastic band or rim, h, when the whole is adapted to be used as a stopper for preserve cans, substantially as specified.

25,491.—George B. Cornish, of New York City, for an Improved Apparatus for Reefing Sails:

I claim constructing the slip bands, G G, in one piece with four flanges, a a a' a', the spaces between a a, and a' a' serving as slip bands, and the central space between flanges, a a', serving as a band on which the reef pennant, J, is wound, said flanges serving to prevent any lateral movement of the yard, and also to prevent the reef pennant from coming into contact with and being injured by the quarter bands, H, all as shown and described.

25,492.—Riley Doty, of Cardington, Ohio, for an Improved Device for Steadying Logs in Sawmills:

I claim the employment of the adjustable frames, F F', provided with journal bearings, n n, and with rollers, a a, the same being operated in one direction by means of the head and tail blocks, and in the other direction by means of a cord and weight, one of said frames being stationed as described by a spring, H, provided with a shoulder, c, and an inclined plane, x, the whole being arranged substantially as and for the purpose specified.

25,493.—John L. Drake, of Cincinnati, Ohio, for an Improvement in Lamps:

I claim the employment or use of the disk, E, applied to the wick tube, B, and used in connection with the cap, C, and arranged relatively with it, for the purpose set forth

25,484.—Eugene Duchamp, of St. Martinsville, La., for an Improvement in Derricks:

I claim the combination of the toggles and right and left screw boom, H, when the latter has its fulcrum movable, as above shown, with the pulleys, J J L N and P, when the same are arranged essentially in the manner and for the purposes described.

25,495.—Oliver T. Eddy, of Philadelphia, Pa., for an Improvement in Coffee-pots:

I claim the annular cone-shaped deflecting plate, E, resting on the bottom of the pot, and arranged in respect to the tube, F, and perforated plate, G, substantially as set forth.

25,496.—Moses G. Farmer, of Salem, Mass., for an Improved Electro-magnetic Steam-boiler Gage:

I claim the combination of an indicator, an electric circuit or circuits, one or more circuit-breakers, with a float, in any manner substantially as described.

25,497.—L. R. Faught, of Atlanta, Ga., for an Improvement in Horse-power Machines:

I claim the arrangement and combination of a stationary geared rim, A, movable rim, E, supporting-bar, D, fitted in the pinions, C C, the shaft, G G, provided with pinions, F F, and wheels, H H, and the shaft, F', substantially as set forth.

25,498.—George Finn, of Oswego, N. Y., for an Improved Method of Operating Crozing Knives:

I claim arranging the cam, c, that works the cutter on the bevel-wheel, O, so that it will not occupy more space on the arm that carries them than that occupied by said bevel-wheel, for the purpose of simplifying the mechanism and economizing space on said arm, which is necessarily limited in length, as represented and shown.

25,499.—Eli Wheeler, of Elmira, N. Y., for an Improvement in Railroad Car-seats:

I claim, first, the arrangement of box-formed supports, c c, cushions, C2 C2, and cushioned seat-backs, D D, of a pair of car-seats, in the manner specified, whereby when the bottoms of the seats are turned over, to fill up the space between the seats, the bed-clothing contained in the box will be exposed so as to be readily removed, and then, when the backs are turned down to fill the place occupied by the bottoms, the said boxes will be closed up and a continuous bed formed from one back edge to the other of the seat, as and for the purpose set forth.

Second, The short open stationary partitions, B B, in combination with sliding-panels, b b, which, when elevated, serve as head and foot boards, and allow ventilation under and above the berth during night time, and when lowered during the day time, afford more room to the upper portion of the body of passengers, as they pass through the aisle of the car, substantially as set forth.

Third, The short-sliding-closed blinds, C C, arranged to operate as described, and serve as foot and head boards and allowing ventilation above and below the upper berth, in combination with the upper berths, E, and partitions, c c, substantially as set forth.

[This invention is a facile method of converting car-seats into comfortable couches while the cars are in motion, one side of the seats and backs being suitably upholstered for seats and the other for couches. In this process of conversion, the box under the seat for containing the necessary bed-clothing is first opened and then closed in making the change. Between each pair of seats there is a skeleton partition for sustaining the upper berths, which can be closed at night by suitable blinds or shutters, thus dividing the car at night into state rooms, each containing four passengers. Cars constructed upon this plan have already been in use several months on the New York & Erie Railroad, and also other railroads, and they are said to give good satisfaction.]

25,500.—John Fretz, of Angel, Cal., for an Improved Furnace and Apparatus for Treating Pyritous Ores:

I claim, first, The hollow stationary cylinder, F, its revolving worm, and its openings, for the admission of the pyrites, and the introduction of air and discharge of the fumes of sulphur, in combination with the rotating cylinder, C, and its internal ribs, the said stationary and rotating cylinders communicating with each other through a pipe, k, the whole being arranged in respect to the furnace, A, substantially as and for the purpose set forth.

Second, The system of vertical boxes or chambers, J K and L, communicating with each other, with the steam pipes, k', the rotating cylinder, C, and the exit pipe, M, and arranged substantially as set forth and for the purpose specified.

25,501.—Richard Garsed and Clayton Denn, of Philadelphia, Pa., for an Improvement in Machinery for Warping Yarn:

We claim, first, The form of the drop-wires as in Fig. 4, arranged in the manner and for the purpose specified.

Second, The cylinder, 20, for the purpose of marking the cuts, operated substantially as above described.

Third, The employment of a register, constructed substantially as above specified, for the purpose of registering the number of cuts while the machine is in motion.

Fourth, The employment of the bar, A, for the purpose of taking the leas, constructed with fingers either on one or both sides, as above described.

Fifth, The combination of the vibrating tube, V, the stationary hook, 52, the movable hook, 55, and the pin, 57, for the purpose of forming the yarn into links, constructed and operated in the manner substantially as above described.

25,502.—Samuel Gissinger, of Alleghany, Pa., for an Improved Churn:

I claim the arrangement in the movable frame, e, of the oscillating churns, i, furnished with dashers, m, and wings, h, in combination with the revolving shaft, f, armed with wings, g, the whole being arranged and combined as described and represented and for the purpose set forth.

25,503.—Eugene Grenet, Jr., of Paris, France, for an Improved Galvanic Battery:

I claim, first, The method of agitating the exciting liquid of a galvanic battery by forcing a current of air through it in the manner and for the purposes substantially as set forth.

Second, Arranging and constructing the zinc and charcoal elements, in combination with the exciting fluid, substantially in the manner described, whereby they may be operated, the one by the other, substantially as set forth.

Third, Forming the charcoal elements by pressing into or on to the surface of plates of lead, when yet in a semi-liquid state, small pieces of charcoal, in the manner substantially as described,

25,504.—C. W. Griffith, of Dayton, Ohio, for an Improved Gage and Box for Casting Journals in Soft Metals:

In combination with a hollow box, I claim a loose removable gage, or centering plate, fitted and fastened to, or held against the box, so as to hold the shaft in its proper position in the box, and at the same time retain or prevent the melted metal that is poured into the hollow box, to form a box around the shaft, from running out.

25,505.—Valentine Hall, of New York City, for an Improvement in Apparatus for Cooling Liquids:

I claim the employment or use of one of more receivers, A B, placed within a tank, F, and connected with the barrel, or cask, H, by means of a siphon I, and with a pump E, within or at the outer side of the tank, for the purpose set forth.

I further claim combining a pump, E, with one or more receivers, A B, connected together and made to communicate with each other, by siphons, C D, when said parts are submerged within a tank, F, and made to communicate with a cask or barrel, H, by means of a siphon, I, extending over the top of the tank, substantially as and for the purpose set forth.

[This invention consists in placing one or more receivers and a pump within a tank supplied with ice-water, and connecting said receiver or receivers and pump by means of a siphon or siphons, and also connecting the receiver or receivers by means of a siphon with the cask or barrel in the cellar below the tank, the whole being so arranged that the liquor may be drawn in a cool state, and the refrigerating device readily cleaned when necessary, all the parts being rendered very accessible.]

25,506.—Halvor Halvorson, of Cambridge, Mass., for an Improvement in Lamps:

I claim, first, The employment or use of the valve, C, in connection with the wick-tubes, B B, for the purpose of regulating the supply of air to the interior of or between two planes of the wicks, g g.

Second, The arrangement of the shaft, e f, and their wheels, e', so that the wheels, e', on one shaft, may gear into those on the other, for the purpose of raising and lowering the wicks simultaneously by the turning of one shaft, f.

25,507.—Riley Haskell, of Painesville, Ohio, for Improved Trolling-bait for Catching Fish:

I claim, first, Constructing the body of an artificial representation of a natural fish, in two detached parts, to be used in combination—one portion thereof revolving, and the other remaining fixed or stationary, both portions being on one shaft, as particularly described and for the purpose set forth.

Second, I claim, in connection with my first claim, filling the upper part of said fixed portion with a light substance, and weighting the lower part thereof, for the purpose of keeping the said fixed portion vertical in the water, as described.

25,508.—Rochus Heinsich, of Newark, N.J., for an Improvement in Tailors' Shears:

I claim constructing the lower bow, with its upper portion widened, and with the projection, p, thereon, so as to form a bearing for the fore-finger within the bow, substantially as and for the purpose set forth.

25,509.—W. M. Hurlbert, of Northfield, Vt., for an Improved Variable Exhaust for Steam-engines:

I claim applying the slides to operate in elbows or inverted L-shaped nozzles, arranged substantially as described.

[This invention consists in making the upper ends or nozzles of the blast pipes each in the form of an elbow or the inverted letter L, and fitting the regulating slides to the horizontal portions of the elbows, so that both can be adjusted simultaneously by right and left-handed screws on the same shaft, thereby providing very conveniently for the variation of the area of the openings.]

25,510.—E. T. Jenkins and F. B. Polley, of Williamsburgh, N. Y., for an Improved Steam Trap:

We claim the round pipe, B, in combination with the valve seat, J, valve, a, ring, c, opening, K, and float, D, when arranged in the manner described and for the purpose specified.

25,511.—Christian Kieffer, of Lancaster, Pa., for an Improvement in Boilers:

I claim the construction of the extension and perforated steam-pipe, C, with the extension hot air flue, B, with the pan, H, with pipes I I, and perforated pipe, K, arranged and combined substantially as described and for the purposes set forth.

25,512.—Josiah Kirby, of Cincinnati, Ohio, for an Improved Bung-hole Borer and Reamer:

I claim the conical-shaped stock when made with a throat, cut through, from the edge of the bit, on one side, to the opposite side of the stock, so that the shavings are made to pass through the stock and out on the opposite side, substantially as described.

I also claim the combination of the auger-bit, C, with reamer, when made in the manner and for the purpose substantially as described.

25,513.—Levi L. Lancaster, of Rocky Mount, N. C., for an Improvement in Seed-planters:

I claim the frame, e, wheels, c c, hopper, m, cylinder, b, pockets or depressions, r, carrying tube, D, furrow-opener, F u, coulter, Z, leveler, H H, and bottom, I I, the whole being arranged for operation conjointly as and for the purpose described.

25,514.—Lewis W. Leeds and Calvert Vaux, of New York City, for an Improved Thermometric Regulator for Heating-apparatus:

We claim so applying the vessel, which we have termed the secondary heater, containing the fluid to act upon the piston, or its equivalent, in combination with the primary heater, and so applying the piston, or its equivalent, in combination with said secondary heater and with the regulating valve, as described, that the secondary heater is exposed at the same time to the heating influence of the primary heater and the cooling influence of the incoming cold air, and the fluid contained therein is, by its expansion and contraction, made to control the admission of the steam or other heating agent, and cause the supply of such agent to the heater to vary inversely with variations in the atmospheric temperature, as set forth.

25,515.—Julius S. Lloyd, of Philadelphia, Pa., for an Improved Approach Opening Gate:

I claim operating the angular bar, D, by means of the carriage, I, with its pulleys, J and J', and guard, L, in combination with the projecting arm, f', of the rod, F, and the cranked and weighted rods, N and N', and their respective cords or chains, the whole being arranged for joint action as and for the purpose set forth.

25,516.—Geo. Lutz, of Logan, Ohio, for an Improved Water-indicator for Steam Boilers:

I claim, first, Operating auricular and visual alarms, either severally or conjointly, at will, by mechanism such as is described, for the purpose set forth.

Second, The combined index and tripping levers, e e', arranged substantially in the manner and for the purpose set forth.

Third, The combination of the tripping levers, e e', balance lever, K, and bifurcated rocking-lever, J, substantially as and for the purpose described.

Fourth, The combination of the catch, d, and dogs, j j', when arranged and operated substantially as and for the purpose set forth.

Fifth, The combination of the bent lever, D, thumb-screw, d', and slotted bracket, L, substantially as and for the purpose described.

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25,517.—**Augustus Miller**, of Grafton, Ohio, for an Improved Method of Making Soap:

I claim soap manufactured from the herein-named ingredients and chemicals, when the same are compounded substantially in the manner and for the purpose specified.

25,518.—G. I. Mix, of Wallingford, Conn., for an Improved Manufacture of Iron Spoons:

I claim, first, The method, substantially as described, of making the handles of iron spoons.

Second, Forming a tongue, D′, upon the bowl blank, and a corresponding recess or inlet, D, upon the handle, or vice versa, substantially as and for the purposes set forth.

25,519.—Geo. G. Noyes, of Worcester, Mass., for an Improved Carpet-fastener:

I claim the bar, A, provided with the hooks, B, knife-edge, a, and spurs, d, substantially as shown, so that it may be readily secured to and detached from the base-board and floor, for the purpose set forth.

[This invention consists in having a hook at the outer end of a small metal bar, the opposite or inner end being provided with a knife-edge and the bottom of the bar nearits inner end provided with spurs, whereby the bar may be readily and securely adjusted to the floor without a permanentattachment, and consequently quickly detached.]

25,520.—W. A. Nugent, of Susquehanna Depot, Pa., for an Improvement in Railroad Chairs:

I claim the shell or body, a, with the cam jars, b b, and the chair, substantially as arranged and for the purpose specified.

25,521.—John K. O'Neil, of Kingston, N. Y., for an Improved Horizontal Water-wheel:

I claim the arrangement of the guide partitions, b b g g, cylinders, B E, wheels, C D, and wheel or buckets, f f, in the manner and for the purposes substantially as specified.

25,522.—Thos. S. Page, of Milan, Ohio, for an Improvement in Composition for Tanning:

I claim a liquor composed of terra japonica, sulphate of alumina and potassa, muriate of soda, nitrate of potash and sulphate of soda, when combined in the proportions and for the purpose described.

25,523.—Collin G. Pollock, of Cincinnati, Ohio, for an Improved Boring and Mortising-machine:

I claim the arrangement and combination of the bar, o, on the arbor, F, projection, p, on the upright, A, lever, K, connected with the arbor, F, by the knuckle joint, M, and the bevel gear, G H, for joint operation, substantially as set forth.

[This invention consists in a peculiar arrangement and combination of parts, whereby a very portable, simple and efficient machine is obtained for boring and mortising. The object of the invention is to perform the work both of boring and mortising with a single shaft or arbor, so arranged with certain necessary parts as to be capable of operating up and down in a vertical direction as the arbor of an ordinary mortising-machine, and also capable of being secured and prevented from moving in said direction and have a rotary motion imparted to it when used for boring.]

25,524.—Chas. Potter, Jr., and C. B. Cottrell, of Westerly, R. I., for an Improvement in Feeding Paper to and from Printing-presses:

We claim the securing of the registering points, I, firmly to a fixed portion of the machine, and releasing the paper therefrom at the proper time by elevating the adjacent surface, J J, as set forth.

We also claim depositing each sheet face upwards on the pile, by carrying it between a vibrating series of tapes, R S, operated substantially in the manner set forth.

We likewise also claim the arrangement of the cylinders, n n′ p p′, and the series of tapes, R S, or their respective equivalents, in the vibrating frame, P, which vibrates on the shaft, F, as a center, and receives its proper vibratory motion from the hook, w, or its equivalent, whereby the frame, P, may be readily unhooked and swung out of the way to allow access to the bed of the press without deranging or disturbing any of the mechanism.

25,525.—Wm. H. Racey, of New York City, for an Improvement in Burners for Vapor Lamps:

I claim the burner, F, and curved rods, G G, one or more in combination with one or more deflecting-caps, D E, and draught tube, C, arranged for joint operation, substantially as and for the purpose set forth.

25,526.—Peter Reynard, of New York City, and Victor Varin, of Brooklyn, N. Y., for an Improved Insect Powder-blower:

We claim the divisions, c c, in the powder-chamber, to insure the powder being in a position to be acted on by the air blown through the perforated diaphragm, d, as and for the purposes set forth.

And in combination with said powder-chamber, constructed as aforesaid, we claim the india-rubber perforated ball, fitted and acting as specified, to give the blast of air.

25,527.—Joshua Rollman, of Sinking Springs, Pa., for an Improvement in Threshing-machines:

I claim the application to a threshing machine of one or more independent fan-blowers, which are attached outside of the machine, and in such position as to prevent any dust, arising from the operation of threshing, from reaching the attendant on the machine, when arranged and operated substantially in the manner described.

22,528.—Gelston Sanford, of Poughkeepsie, N. Y., for an Improvement in Horse-power Machines:

I claim, first, The combination of the internal toothed wheels, C and F, and their connected pinions, with the hollow standard, B, when arranged in the manner and for the purpose set forth.

Second, The combination of the hollow standard, B, with the shaft, K, and its connected gearing, I and J, in the manner and for the purpose described.

Third, The combination of the adjustable bearing or frame, M, with the hollow standard, B, and shaft, K, as and for the purpose set forth.

25,529.—Nathan Sargent, of Charlestown, Mass., for Improved Tops for Tables:

I claim, as an improved article of manufacture, a panoramic table or table-top, the same being constructed and operated in the manner and for the purpose set forth.

I also claim the peculiar mechanism described, whereby the canvas or panoramic cloth is maintained with proper tension upon each of the rollers, however such cloth may vary in thickness or in number of folds upon such rollers.

25,530.—Casper Schultze and J. Frederick Schroeder, of Covington, Ky., for an Improvement in Straw-cutters:

We claim a cutting box, constructed as shown and specified, that is, with adjustable compound knife-wheel, H, in combination with feeding chute, C, when these several parts are constructed and arranged for operation conjointly as and for the purposes described.

25,531.—Wm. W. Shipman, of New Haven, Conn., for an Improvement in Machines for Making Sewing-machine Needles:

I claim the feeding plier formed by the lever, F, and block, D, in combination with the punching-die, P2, and die, P3 and 21 31, Fig. 8, the cutter, N, and clamp formed by J J and I I, the whole in combination as set forth, and operated in the manner and for the purposes specified.

25,532.—Geo. B. Simpson, of Washington, D. C., for an Improved Electrical Heating-apparatus:

I claim the insulation of the metallic coil or helical electrode, which I call an electro-heater, and the successful generation of heat by passing currents of electricity over a coil or coils of platina, or other metallic wire, resting on and supported by a non-conducting electrical base, or encased in metallic tubes, or open vessels insulated with any of well-known substances non-conducting of electricity, as described.

25,533.—John Joseph Charles Smith, of Covington, Ky., for an Improved Mode of Constructing Matrices, &c.:

I claim the discovery of rendering a composition or alloy of copper and tin pliable and in such a state as to admit of an easy impression of any figure or design on or in metal, whether engraved or produced by means of electrotyping, as a copy of any figure, design or object, thus yielding a perfect matrix or mould, and this process I further claim, as my invention, in connection with the manufacturing of types of the alloy of copper and tin, as already described, and which will and shall produce the intended effect.

25,534.—Charles Stearns, of Lowell, Mass., for an Improvement in Making Lightning-conductors:

I claim the twisting rollers, constructed as described, in combination with the corrugating rollers, for producing the corrugated twisted copper rod.

25,535.—Theodore J. Steffe, of Lancaster, Pa., for an Improvement in Horse-rakes:

I claim the arrangement and combination of the teeth-heads, E, key, N, spiral spring attachment, F, lifters, B B, lever, G H, cleaners, c C, when these several parts have their center of motion on the axle of the machine.

I also claim, in combination with the above, the foot-brace, K L, hinged at I I, slide, M, and slot, O, substantially as and for the purpose specified.

25,536.—Geo. Strause, of Boonsboro, Md., for an Improvement in Hominy Mills:

I claim giving to the shaft, D, substantially the shape represented, when the said shaft is armed with toothed segments, and is also operated within a tube which is also armed with counteracting segments, substantially in the manner set forth.

25,537.—David H. Van Duzer, of Sugar Loaf, N. Y., for an Improvement in Bridges:

I claim in combination with the blocks, E F G H I, rods, B B′, blocks, C C′, and bolts, D D′, arranged as shown, the arrangement of the plates, L, all substantially as and for the purposes shown and described.

[The nature of this invention consists in the employment of iron gripes, so arranged that each stone or boulder will be firmly griped or bound to its adjacent stone and the whole arch sustained and strengthened.]

25,538.—Samuel Walker, of Roxbury, Mass., for an Improvement in the Take-up for Trimming-looms:

I claim giving to the take-up roll of a trimming-loom a reciprocating motion longitudinally on its axis, for the purpose specified.

25,539.—Suspended.

25,540.—Charles Fontayne, of Cincinnati, Ohio, for a Photographic Printing-machine:

I claim, first. The described machine for printing or multiplying photographic pictures.

Second, The described art of multiplying positive photographic pictures or expressions from the same negative upon the same sheet of sensitive paper or other material.

Third, Causing the sensitive material used for the reception of photographic impressions, latent or otherwise, made by the agency of solar or other light, passing through a negative, to traverse the aperture or negative employed.

Fourth, The traversing bed, whether cylindrical or plane, confined within a dark chamber, whose surface may be moved by ratchets, screws, cranks, or their equivalents, for the purpose of carrying the sensitive material when the same is used in connection with a negative, from which it receives positive impressions substantially as described.

Fifth, The employment of continuous sliding or revolving disks, with springs and spring-stops, or their equivalents, to give them a uniform motion and overcome the momentum or rebound, for admitting and shutting off light uniformly to and from all parts of the surface to be acted upon in printing positive photographic pictures from a negative, substantially as described.

Sixth, The application of a lens or lenses for the purpose of condensing light, when used in combination with negative, 28, the sensitive material, and slide or cut-off, for admitting or shutting off light, for the purpose of photographic-printing.

Seventh, The combination of condensing-lens, 33, negative, 34, daguerreotype-tube, 75, with its lenses, 76, the sensitive material and slide or cut-off for photographic-printing substantially as described.

Eighth, The combination of the sensitive material, negative, 28 (as distinguished from negative, 34), and slide or cut-off, for the purpose of photographic-printing.

Ninth, The method of raising the glass negative or other matrix, 28, from the sensitive material, to permit the motion of the latter, and the method of lowering again, substantially as described.

Tenth, The method of supporting and adjusting negative, 28, substantially as described.

Eleventh, The use of the glass negative (when negative 28 is used), or the use of a piece of plain glass in the place of it (when negative 34 is used), or the use of a skeleton frame, for the purpose of pressing the sensitive material smoothly and evenly on roller, 5, or traversing bed while the photographic impression is being made.

Twelfth, The alternate admission and exclusion of light passing through a negative, to act upon a traversing sensitive material, confined in a portable dark chamber, substantially as described.

Thirteenth, The rod, 8, working through hollow, slotted shaft, 6, and affixed to roller, 5, by plate, 9, for the purpose described.

Fourteenth. The combination of the lever, 12, with its spring-catch, 13, with the ratchet-wheel, 14, nose, 82, of shield, 15, and slotted stop 11, substantially as and for the purposes described.

35,541.—Henry Whittington, of Philadelphia, Pa., for an Improvement in Cut-off Gear for Steam-engines:

I claim the inclined spiral edges, x x, on the revolving and sliding sleeve, B, when the latter is applied to operate the cut-off valve, G, the descent of which is caused by the pressure of steam above the valve, and when the inclined edges serve to retard the descent of the valve, as set forth.

25,542.—Asbury Wilkinson, of Madison, Ind., for an Improved Washing-machine:

I claim the combination of circular boards, B and C, suspended from a frame above by springs, b b b and c, with a rotary corrugated roller, working between them, all constructed and operated substantially as set forth.

25,543.—Jeptha Avery Wilkinson, of Brooklyn, N. Y., for an Improved Registering-apparatus:

I claim a series of counting-disks standing at right angles, or nearly so, to each other, and each formed with a thread or worm around its periphery, taking teeth on the next counting-disk in the manner and for the purpose specified.

I also claim the arrangement of the counting-disk, q9 and q10, in the manner specified, whereby they can be disconnected and set to commence counting when required, as and for the purpose described and shown.

25,544.—John F. Cook, of Baltimore, Md. (assignor to himself and George F. Page, of same place), for an Improved Try-cock for Steam-boilers:

I claim combining with the barrel of a try-cock, a two-armed lever, one provided with springs or weights, and the other with a rubber (or other equivalent disk), so that the weighted-arm shall hold the valved or disk arm against the bore of the barrel of the cock substantially as described and represented.

25,545.—Henry W. Gray, of Cleveland, Ohio (assignor to himself and W. H. Alvord, of Homer, N. Y.), for an Improvement in Railroad Chairs:

I claim the forming the railroad chair in two sections, having the outer surfaces, F, convex, as described, in combination with the gripe, C, and beam, D, the several parts being arranged in the manner and for the purpose set forth.

25,546.—Horatio Francis Hicks, of Grand View, Ind. (assignor to Hicks Brothers, of same place), for an Improvement in Presses:

I claim the described combination of stepped-bearings, G and I, with rollers, K′, adapted to operate in connection therewith, without endwise pressure or tendency to displacement, in the manner and for the purpose set forth.

25,547.—George W. McCord, of Centralia, Ill. (assignor to himself, J. F. Lobdell, of Centralia, Ill., and P. V. N. Davis, of Rush, N. Y.), for an Improved Deep Sea Sounding-apparatus:

I claim the arrangement of the cylinder, a, piston, p, graduated scale, f, cap, i, and vernier or register, k, constructed and operating substantially as described, for the registration of marine-soundings upon the principle of hydraulic pressure.

25,548.—G. H. Sanborn, of Boston, Mass., and John E. Coffin, of Portland, Maine (assignors to G. H. Sanborn, aforesaid), for a Machine for Shaping and Finishing the Backs of Books:

We claim, first, The employment, for shaping or finishing the backs of books, of a divided roll or pair of segments, C C′, operating across the backs from the center to both sides thereof, substantially as described.

Second, The combination of the cam, T, slide, R, toggle, P P, spring, Q, link, y, lever, o, link, u, and toggles, F F, with the book-holder, for the purpose of raising the holder and causing it to close upon the book before each operation of the divided roll or pair of segments, substantially as described.

Third, Attaching the segment-levers, G G′, or their equivalents, to levers, H H, operated substantially as described, by cams, N N, on the constantly-revolving main-shaft for the purpose of throwing the segments out of the way of the holder, at the proper stage of the operation of the machine, to permit the removal and introduction of the books.

25,549.—Thomas Shaw, of Philadelphia, Pa. (assignor to himself and J. C. Bailey, of same place), for an Improvement in Stoves:

I claim, firstly, The adjustable legs, a, when combined with the casing, A, and its gage-cylinder, and arranged as set forth, so as to serve the double purpose of tilting the stove more or less on one side, and regulating the admission of air into the casing.

Secondly, Operating the valve, D, for regulating the flow of gas into the casing, by means of the object to be heated by the flame, in conjunction with the devices set forth, or their equivalents.

25,550.—A. T. Underhill, of New York City (assignor to C. R. Underhill, of New Castle, N. Y.), for an Improvement in Converting Reciprocating into Rotary Motion:

I claim the arrangement and combination of the frame, I, guards, S S′ S″ S‴, and ratchet-wheels, J J′ J″ J‴, substantially as shown and described, so that the rotation of the shaft, H, may be reversed as set forth.

25,551.—Wm. F. Warburton and Wm. B. Atkin, of Philadelphia, Pa. (assignors to Wm. F. Warburton, aforesaid), for an Improvement in Machinery for Perforating Hat Bodies:

We claim, firstly, The system of pointed pins, m, hung independent of each other to the cross-head, J, furnished each with a separate spring, and arranged and operated substantially as set forth, in combination with the hat block attached to the face plate, F, on the spindle, E, for the purpose specified.

Secondly, The ratchet-wheel, G, of the same form, or thereabouts, as that presented by a transverse section of the hat to be perforated, in combination with the face plate, F, and its hat block, the said wheel being operated by the pawl, f, and the appliances connected therewith, or their equivalents, in the manner and for the purpose set forth.

25,552.—Morris L. Keen, of Roger's Ford, Pa., for an Improved Mode of Distilling Liquids from Coal Tar:

I claim the application of additional heat at or near the surface of the coal tar, or other similar hydro-carbon, when used in combination with pressure in the boiler, for the purpose of preventing the tarry foam from rising and over-running the still, and thus endangering the operator as well as the premises, as described.

RE-ISSUES.

James Perkins and William H. Burnet, of Newark, N. J., for an Improved Machine for Bending Metal Pipe. Patented October 14th, 1856; re-issued September 20th, 1859:

We claim the mandrel, d, substantially as described, and therewith traversing-roller, b, or its equivalent, for bending coils of metal pipe, and, in combination therewith, the furnace, in the manner and for the purposes set forth.

David B. Rogers, of Pittsburgh, Pa., for an Improvement in Cultivator Teeth. Patented November 1st, 1845; re-issued September 20th, 1859:

I claim making the shank or upper part of cultivator teeth of thin plate-steel, U-shaped or curved round in front, substantially as described, for the purpose of securing the necessary strength to permit the tooth to be made entire, shank and blade of a single piece of metal, and also of enabling the tooth to be secured in its place in the beam by means of a wedge driven into the cavity of the shank substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the arrangement, substantially as described, of a cutting-apparatus and a reel, with respect to a driving-wheel and a grain wheel, or its equivalent, and a raker's seat, or its equivalent, so that the major part of the weight of the cutting-apparatus and reel shall be in advance of the axis of oscillation of the machine on the said wheels, while the raker's seat or stand shall be located behind that axis, and the machine, with the raker thereon, nearly balanced on its axis of oscillation substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the combination of a tongue, or its equivalent, to draw the machine by, a driving-wheel and gearing arranged at the side of the frame, a short platform, a reel to gather the grain to the platform, and a stand or seat for the raker, fixed upon the machine, so as to enable the raker conveniently to discharge the grain and lay it in gavels upon the ground at the side of the swath, and out of the return path of the horses, substantially as described.

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Cyrus H. McCormick, of Chicago, Ill., or an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1858:

claim a seat or stand on the reaping-machine for the support of the raker, laterally ard in front, substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the combination of the reel, the divider, and the rakre's seat or stand, co-operating together in such manner that the grain deposited upon the platform by the reel and divider may readily be grasped and discharged from the machine by the raker at his seat substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the combination, in a reaping-machine, of the following elements, namely, the draught and the gearing, arranged at the side of the machine; two compressors, one arranged at each end of the cutter; the short reel to sweep over the space between the compressors, and the short platform, substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the combination of the grain-guarded platform to receive and retain the cut grain, with the divider and the reel, the whole arranged substantially in the manner and for the purposes described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the combination of the reel support, at the rear part of the outer side of the platform, with the low flat frame and the divider, arranged substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim the arrangement of the frame, the finger-beam, and the platform, and the driving-wheel and gearing, relatively to each other, so as to secure an unobstructed gavelling-space, G, at the side of the platform, behind the finger-beam, substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim a reaping-machine frame, consisting, namely, of two principal beams, D D' and M, crossing each other, and arranged relatively to the supporting-wheels, so as to give support to a platform not extending behind the gearing, and without interfering with the cutter on one side or the gavelling-space on the other, substantially as described.

Cyrus H. McCormick, of Chicago, Ill., for an Improvement in Reaping-machines. Patented October 23d, 1847; re-issued May 24th, 1853; again re-issued December 21st, 1858; and again re-issued September 20th, 1859:

I claim, first, A dividing-board having a surface inclining towards the cutter and platform, and an outer dividing-line and an inner dividing-line, and acting substantially as described.

Second, I claim the combination of the inclined dividing-board with a guide-bar substantially as described.

Third, I claim the combination of a reel with the inclined dividing-board substantially as described.

Fourth, I also claim the combination of a reel with the dividing-board and guide-bar substantially as described.

Royal E. House, of Binghampton, N. Y., for an Improvement in Magnetic Printing-telegraphs. Patented April 18th, 1848; re-issued September 20th, 1859:

I claim, first, A series of keys, each corresponding to a character, in combination with a revolving part of a circuit, so that the touching of one of the former may cause the circuit to be broken or closed for the purpose of printing, substantially as specified, when the revolving part of the circuit is in a certain required angular position, properly corresponding to the key struck.

Second, I claim a series of keys, each corresponding to a character, in combination with a revolving portion of a circuit and a shaft provided with pins, arranged in a helix, all substantially such as specified, or the equivalents of the whole, acting to cause the circuit to be broken or closed when the revolving part is in a certain angular position, in proper correspondence with the key struck, for the purpose of printing a proper corresponding letter by means of any suitable machinery.

Third, I claim a key-board or series of keys, in combination with a rotating portion of a circuit, and a type-wheel, or its equivalent, so governed as to present a proper letter corresponding with a key touched to produce an impression, the combination being substantially such as set forth.

Fourth, I claim, in combination, a single circuit of conductors, a key-board or series of keys, a revolving portion of a circuit, and a type-wheel, substantially such as specified, and these also in combination with a printing-press and with a key-shaft, or either of them, each part being substantially such as described.

Fifth, I claim a series of keys, each corresponding to a character, in combination with a type-wheel having similar corresponding characters, both substantially as specified, when so connected by any appropriate devices that a certain type shall be in a certain locality when a corresponding key is actuated; and I claim these two elements, in combination with a single circuit of conductors and with a printing-apparatus, or either of them.

Sixth, I claim actuating or driving a revolving portion of a circuit or a key-shaft, or both of them, by means of a prime-mover acting upon them through a friction connection, the mode of operation being substantially as specified, and doing away with sudden jars and increasing rapidity of operation, when contrasted with a positive connection between such parts and a prime-mover, and also permitting the two to move with varying velocities.

Seventh, I claim actuating or driving a key-shaft and a revolving portion of a circuit, or either of them, by means of a friction connection with a prime-mover, when the velocity of such prime-mover is controlled by a governor, or some equivalent for the purpose, which either prevents its moving too fast or increases its velocity when going too slow, or performs both these duties, substantially under the mode of operation described.

Eighth, I claim governing or controlling the motions of a prime-mover, which actuates a printing-apparatus by the breaking and closing of an electric or galvanic circuit, so that such apparatus is put in operation both by the breaking of a circuit and by the closing thereof, substantially in the manner specified, and also the controlling of a printing-apparatus, so that it shall be permitted to print when a spring returns to its normal position at the time that a circuit is broken, the mode of operation being substantially such as set forth.

Ninth, I claim, in a printing-telegraph, moving the paper to the types to produce an impression on the former, substantially in the manner described, as distinguished from former modes of operation, by which the types were moved towards the paper.

Tenth, I claim in combination, a revolving type-wheel and a roller, or its equivalent, charged with coloring matter, so as to deposit such matter on the types as they, in succession, come in contact with the roller, the combination being substantially such as set forth; and this I claim also when the roller is grooved as described.

Eleventh, Being aware of the facts that type-wheels have been permitted to revolve, step by step, when controlled by escapements, and when such escapements have been actuated either by a prime-mover governed by a pendulum or by electric-magnetic force, I claim actuating an escapement which controls the motions of a type-wheel by a prime-mover, whose motions are regulated by the breaking and closing of a circuit, under a mode of operation substantially such as described, whereby a small force, derivable from magnetism, controls any necessary power of a prime-mover, there being a breaking and closing of circuit correspondent with each vibration of the escapement.

Twelfth, I claim a hydraulic regulator, substantially such as described and for the purposes set forth.

Thirteenth, I claim a hydraulic regular, in combination with a type-wheel and a printing-apparatus and a prime-mover, the combination being substantially as specified, and causes the press to print when the type-wheel ceases to move for a longer time than usual.

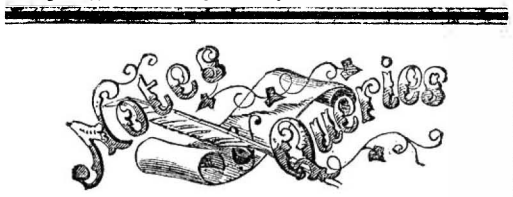
Fourteenth, In combination with a type-wheel and a printing-press or apparatus, I claim apparatus, substantially such as spectfied, for making an alarm when that apparatus is permitted or caused to act by the breaking and closing of the same circuit of conductors, which, by its breaking and closing, permits the printing-apparatus to come into action.

DESIGNS.

Eliza A. Murdock, of Boston, Mass., for a Design for a Skating or Riding-cap for Ladies.

John Martino, of Philadelphia, Pa. (assignor to D. Stuart and J. R. Peterson, of same place), for a Design for a Cooking-stove.

John Martino and James Horton, of Philadelphia, Pa. (assignors to D. Stuart and J. R. Peterson, of same place), for a Design for Cylinder-stoves.



Q. & B., of N. H.—If an article precisely similar to yours was publicly known and used before you invented your device, then your patent is of no value, and the grant by the Patent Office was an error. The grant of a patent for a device which the Commissioner believed to be new, but which in reality was old, is an illegal grant, and therefore valueless, because the statute expressly provides that patents can only be issued for inventions "not known or used before his or their discovery." The issue of a patent is not a guaranty by the government that the invention is new; it is a certificate to the effect that the Commissioner believed it to be novel and useful. No money is refunded by government, even if the patent proves to be invalid. If the patent is valid, the government through its courts will defend you in its enjoyment, if you apply to them in due form. Unless your deeds of assignment expressly bind you to defend the patent, you are not compelled to do so. Under an ordinary assignment you would not be so bound.

S. A. S., of Vt.—A number of patents have been issued for fountain pens, but few however are in use, If you will send us a sketch and description of yours, we will give you our opinion of its novelty,

H. S. T., of Vt.—We cannot furnish you with the back numbers you want of Vol. XIV. You can procure a bound volume complete for $2.75.

D. S. G., of Texas.—Your alleged improvement in pumps closely resembles others that we have seen, and we are of the opinion that a patent cannot be procured upon the arrangement.

W. P. H., of Va.—There would not be any difficulty in attaching a tube to a turbine wheel in such manner as to prevent the water from driving the wheel as fast as the "head alone would force it." A tube attached in almost any manner would have this effect.

A. K. L., of Ala.—The best method of making a white-wash for outside exposure is to slack half a bushel of lime in a barrel, add one pound of common salt, half a pound of the sulphate of zinc, and a gallon of sweet milk.

J. Q. A., of Mass.—A strong solution of isinglass, to which is added a small quantity of alcoholic spirits, is very adhesive and dries quickly. Seed-lac varnish, made with alcohol as a solvent, dries rapidly, and may suit your purpose better than one by isinglass.

W. B. G., of N. Y.—The carbon cylinders for the Bunsen batteries are made with powdered hard charcoal molded into form with a paste of wheat or rye flour. Mr. J.'s subscription to end of Vol. II. will be $1.10. If you have constructed a magnetic engine surpassing the steam motor, you should exhibit it in public as soon as possible, in order to demonstrate its superiority to the satisfaction of the public. There is no other way of conquering public prejudice against it.

D. A. M., of Pa.—Condie's monster steam-hammers are manufactured in Glasgow, Scotland. This is all the information we can give you respecting them at present.

E. W. D., of Conn.—The self-operating mule was the result of a series of English inventions. When they began to be made in this country, British mechanics made $4 or $5 per day in setting them up and starting them.

G. D. H., of Mass.—The reason why the bit of silver ingot which you send us is full of air-holes, or "blown," as the metal-workers call it, is this, the material of which your mold is made is not sufficiently pervious to the air.

G. N. H., of N. Y.—Brass castings are rendered bright by steeping them for a few seconds in dilute sulphuric or muriatic acid. They sometimes require to be scoured with sand, as well as steeped in the acid. They should be washed afterwards in warm soft water, then dried in warm sawdust, and finally treated with a thin coat of lac-varnish, colored yellow.

H. C. B., of Tenn.—Iron rails frequently become magnetic from the vibrations of the trains in passing over them. A bar of hard steel placed in an inclined position and subjected to several sharp blows becomes magnetic. When a steel punch is driven hard into an iron bar, it is oftentimes rendered magnetic by a single blow.

B. F. A., of Ky.—The best cement known to us for closing up the seams in your tile-roof is composed of equal parts of whiting and dry sand and 25 per cent of litharge, made into the consistency of putty with linseed oil. It is not liable to crack when cold, nor melt, like coal-tar and asphalt, with the heat of the sun.

E. B. H. of Mass.—The tassel-tip which you have sent us appears to be made of the ivory nut, not a composition of rice. We have exhibited it to two turners in ivory who examined it through a magnifying glass; one said it was porcelain, the other, ivory nut. Probably it is a composition of plaster of Paris and rice starch, as you suggest. Porcelain buttons, we believe, are all imported. They are struck out of porcelain clay in dies under great pressure, then vitrified in kilns, like china and stoneware.

H. K., of Wis.—A beautiful red ink may be made with carmine of cochineal, mixed with weak water of ammonia, to which a little gum arabic mucilage should be added. A strong decoction of Brazil wood, to which is added a little alum water, and gum mucilage, makes a cheap red ink, but it is not so beautiful as the carmine.

J. L., of Ga.—The fluid employed in batteries with negative plates of lead is dilute sulphuric acid. We prefer platina plates—the Smee battery.

G. O. K., of Vt.—It will take a little more than one horse power to raise 300 gallons of water 12 feet per minute, as this is equivalent to lifting 36,000 pounds one foot high in this space of time, A horse-power is equal to 33,000 pounds lifted one foot per minute. Communicate with Guild & Garrison, 74 Beekman-st., this city, about their steam-pump; it is a good one.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Sept. 24, 1859:—

B. S. M., of Iowa, $25; H. M., of N. Y., $25; H. P., of Mass., $30; J. G. K., of N. Y., $30; W. S. M., of Conn., $30; L. B., of Wis., $10; T. M., of N. Y., $15; J. W. D., of Mass., $25; S. T. T., of Ill., $25; G. P., of N. Y., $30; Mrs. L. B., of N. Y., $40; L. M., of Ga., $30; R. C. D., of N. Y., $30; C. D., of Conn., $30; J. B., of N. Y., $30; J. K. D., of N. Y., $25; O. P., of N. Y., $30; R. L. & C. S., of N. Y., $25; S. W. S., of Wis., $30; J. T. T., of Texas, $30; S. T. P., of Ga., $30; D. S. C., of N. Y.. $60; J. H. R., of N. Y.. $250; J. H. W., of Md., $250; H. E. W., of Mass., $30; B. R., of Mass., $20; H. B. F., of N. Y., $30; L. B., of Texas, $30; J. K., of Mass., $60; H. W., of Ky., $60; H. H., of La., $30; J. B. A., of N. Y., $100; T. B. B., of Ill., $25; S. A. S., of Mass., $30; N. G. S., of N. Y., $25; J. D., of Pa., $30; N. H. C., of N. Y., $15; N. B., of Ill., of $30; W. D., Jr., of Pa., $55; E. H. H., of Ga., $25; R. S. S., of Ga., $55; P. L., of N. Y., $10; C. W. W., of N. Y., $35; A. C. F., of N. Y., $250; G. S. A., of N. Y., $100; H. B., Jr., of Pa., $30; A. N. M., of Ill., $30; D. E. H., of Mass., $25; A. E., of Ohio, $30; H. & F., of Pa., $25; F. B. W., of Ill., $32; S. & H., of N. Y., $100; S. L., of Maine, $55; J. W. F., of Pa., $50; W. C. G., of Conn., $55.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 24, 1859:—

W. B., Sen., of N. Y.; A. M., of N. Y.; C. W. W., of N. Y.; N. H. C., of N. Y.; J. W. D., of Mass.; B. S. C., of N. Y.; D. & G., of N. Y.; W. C. G., of Conn.; E. H. H., of Ga.; J. W. C., of N. Y. (two cases); J. McN., of L. I.; R. E., of N. Y.; S. T. T., of Ill.; J. K. D., of N. Y.; S. W. S., of Wis.; E. C., of Vt.; B. S. M., of Iowa.; T. B. B., of Ill.; D. E. H., of Mass. R. L. & C. S., of N. Y.; J. W. F., of R. I. (two cases).

Hints to our Patrons.

BACK NUMBERS.—We shall hereafter commence sending the SCIENTIFIC AMERICAN to new subscribers from the time their subscriptions are received, unless otherwise directed; the back numbers can be supplied from the commencement of the volume to those who may order them. It is presumed most persons will desire the back numbers, and such as do will please to so state at the time of sending in their subscriptions; they can, however be supplied at any subsequent period.

INFALLIBLE RULE—It is an established rule of this office to stop sending the paper when the time for which it was prepaid has expired, and the publishers will not deviate from that standing rule in any instance.

INVENTORS SENDING MODELS to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies, either through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them.

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SUBSCRIBERS to the SCIENTIFIC AMERICAN who fail to get their papers regularly will oblige the publishers by stating their complaints in writing. Those who may have missed certain numbers can have them supplied by addressing a note to the office of publication.

Literary Notice.

THE KNICKERBOCKER, for October, John A. Gray, publisher, New York City. After an absence of many months, this magazine, twenty-six years old, appears upon our table, and right glad we welcome it back. One number contains more original wit, of a kind which no one but Clarke can perpetrate, than any other monthly published. We hope the work has a good circulation—it deserves it.

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Thirty cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

IMPORTANT TO INVENTORS.

AMERICAN AND FOREIGN PATENT SOLICITORS.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, continue to procure Patents for Inventors in the United States and all foreign countries on the most liberal terms. Our experience is of thirteen years' standing, and our facilities are unequaled by any other Agency in the world. The long experience we have had in preparing Specifications and Drawings has rendered us perfectly conversant with the mode of doing business at the United States Patent Office, and with most of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at our office.

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A pamphlet of information concerning the proper course to be pursued in obtaining Patents through our Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. We also furnish a Circular of information about Foreign Patents.

The annexed letters from the last two Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

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CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

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Your obedient servant, J. HOLT.

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Auf der Office wird deutſch geſprochen.

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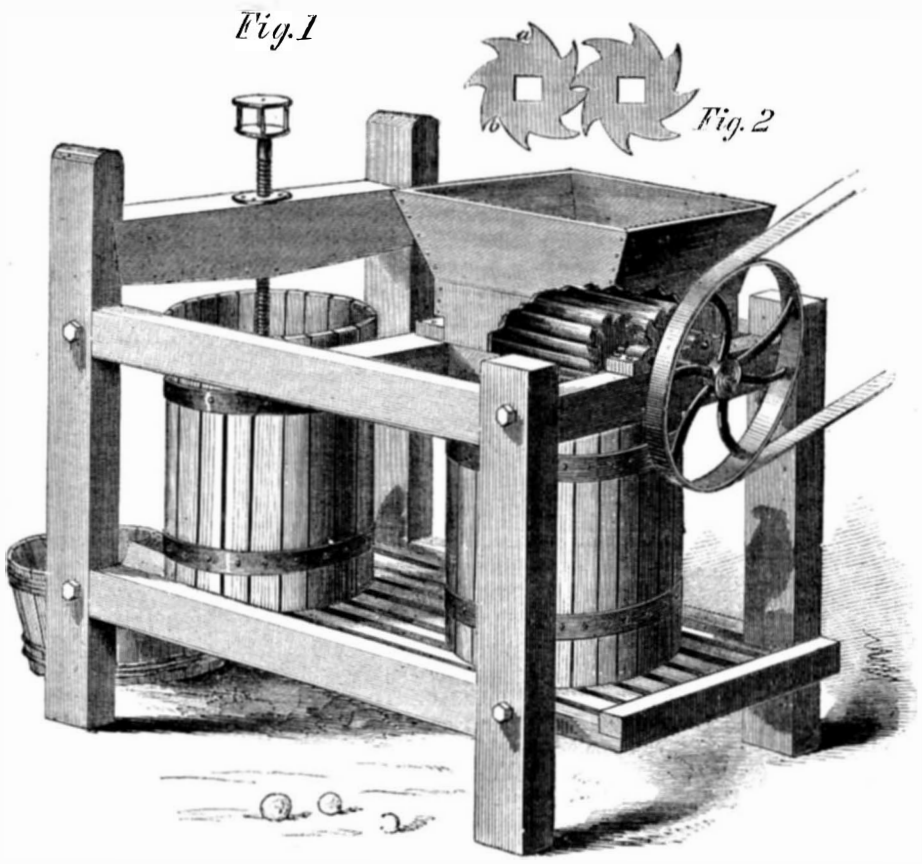
IMPROVED CIDER AND SUGAR-MILL.

When we were once called from drawing cider through a long straw from the bung-hole of a barrel, to the less pleasing occupation of cleaning the pummice from the rollers by means of a little wooden-scoop, we little thought that we should ever have occasion to describe an invention of an octagonal, tangential, curved, longitudinal tooth for a cider-mill. But who knows what a day may bring forth? and such is the task we have now taken in hand.

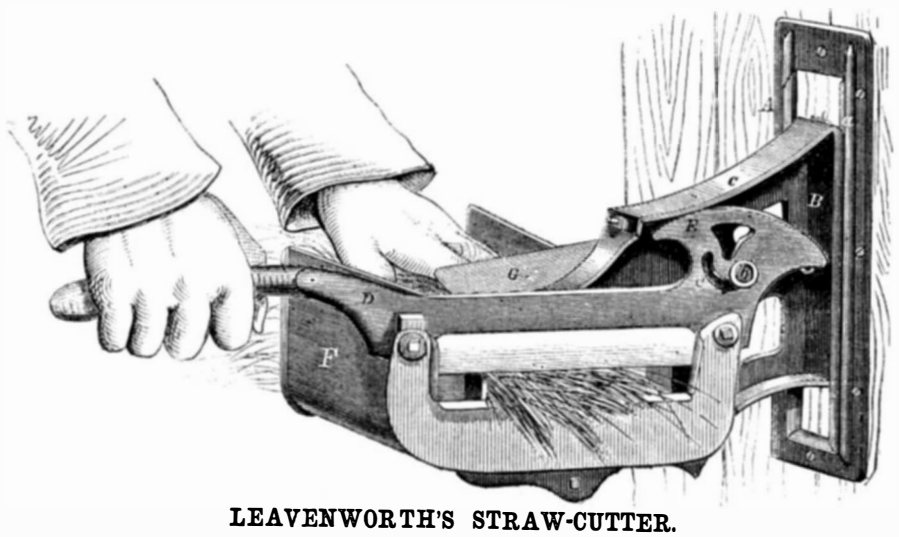
A cider and sugar-mill is represented in the accompanying cut, constructed on this plan; Fig. 1 being a perspective view of the whole machine, with two views of the press in different positions, and Fig. 2 an end view of the rollers. As the essential part of the invention is in the form of the rollers, we give particular attention to the description of these, especially as the general plan of the machine will be understood by a glance at the engravings. The rollers may be of wood or iron, of any size desired, but are usually made of cast-iron, 10 inches long, and $5\frac{3}{4}$ inches in diameter. In order to obtain the form of the teeth, two circles are described; one of the same diameter as the rollers, and the other of two-thirds the diameter. These two circles are divided into eight segments, the octagon of the interior circle forming the base of the teeth. The external curve of each tooth is an arc of the circumference of a circle, of which the center is at the base of the second tooth beyond. Therefore, in order to form this curve, one leg of a pair of dividers is placed at *b*, on one of the eight divisions of the interior circle, and with the other leg at *a*, the third division from this, an arc is swept from the interior to the exterior circle. The smaller curve is also an arc of the circumference of a circle, described by a smaller radius, from the point of the tooth to the base, as shown in the cut.

The advantages claimed in this mill, are great simplicity, and, consequently, a small amount of friction; great strength and durability of the cylinders; the facility with which it can be adjusted to grind either coarse or fine; and, finally, the greater ease, freedom, rapidity and thoroughness with which it is enabled to do its work.

The patent for this invention was granted to John Shaefer, August 9th, 1859; and further information in regard to it may be obtained by addressing A. P. Hibshman & Co., Lancaster, Pa.



SHAEFER'S CIDER AND SUGAR MILL.



LEAVENWORTH'S STRAW-CUTTER.

There are few new implements more required by farmers than a straw-cutter, and the same must therefore be constantly kept on hand, and in a place where it can be put in operation without much trouble. Ordinary straw-cutters are always in the way when not used, and a device so arranged that it can be suspended from a post in the stable when it is to be used, and taken off and hung up out of the way when not wanted, will therefore be gladly received by our farmers. Such an implement is represented in the accompanying engraving; and, besides the great advantage that this cutter can easily be put out of the way, it is also so arranged that a shear-cut is given to the knife by means of two segmental rockers, which are connected by two springs, so that the whole works very easy, and almost without friction.

Our engraving represents this straw-cutter suspended from a bracket, A, which is screwed up on a post or on some convenient part of the wall. This bracket is provided with a dovetailed groove or slot, *a*, which receives the end of the frame, B. This frame, as well as the bracket, are constructed of cast-iron, which renders the whole very durable. The top of the frame, B, forms a rocking surface, C, and a lever, D, to which the knife is attached, is secured to the frame by means of a pivot, *b*, that fits into a half-circular slot, *c*, leaving the lever free to move in a longitudinal direction as it oscillates. The upper part of the lever forms a rocking surface, E, similar to the rocker, C, on the frame, and the opposite ends of the two rockers are connected by two springs, *d*, each of which extends from one end of the rocker, C, to the opposite end of the rocker, E. These springs are protected by projecting flanges on the rockers, and they prevent the two working surfaces slipping one over the other, so that the rocker, E, is compelled to roll on the rocker, C, when the end of the lever is moved up and down.

Secured to the frame, A, is the feed-box, F, and an adjustable guide-plate, G, is attached to the front side of the lever, D, in front of the knife, in such a manner that it governs the length of the cuts.

The above-described arrangement of the rockers and springs gives to the knife that particular drawing motion which so greatly facilitates the cutting operation, and, at the same time, the friction of the working parts is almost entirely avoided. This straw cutter is very simple, not liable to get out of order, and easily handled. When it is not used, the frame, B, together with all its appendages, is slipped out of the bracket, A, and it is hung up to the wall.

The inventor, Mr. Lucius Leavenworth, has applied for a patent on the same, and he will be happy to furnish further information, upon being addressed at Trumansburg, N. Y.

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Publishers, No. 37 Park-row, New York.

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